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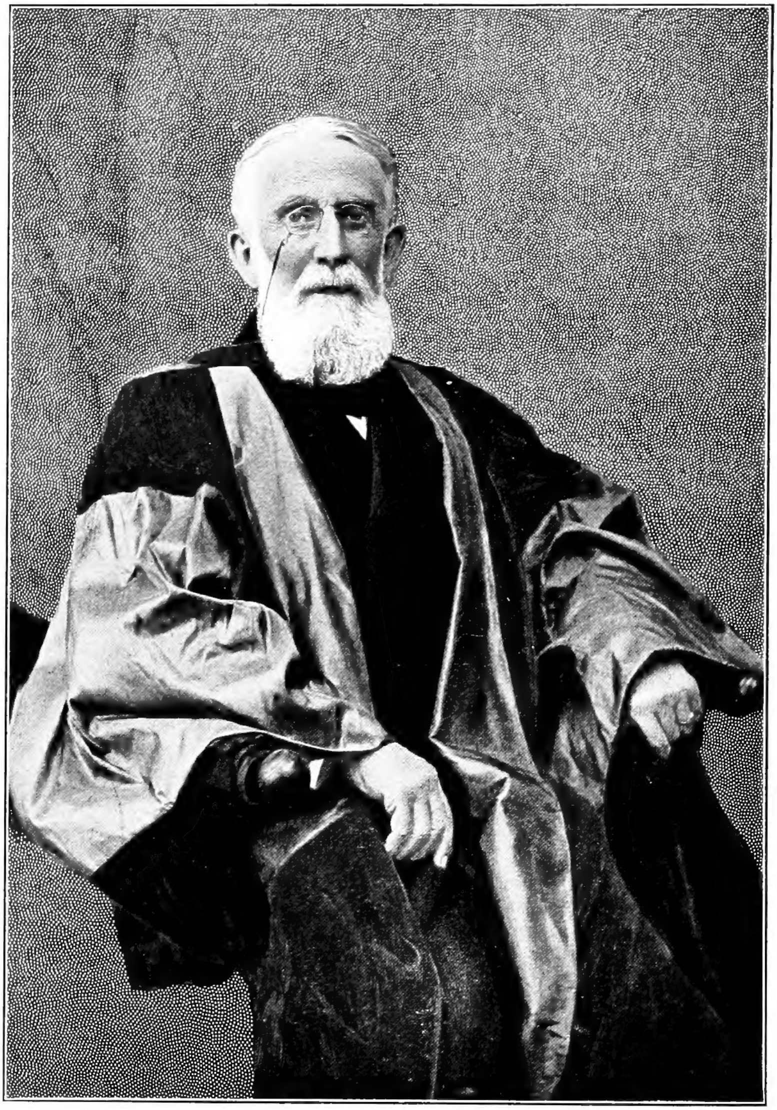

ANDREW DICKSON WHITE

Cornell University

A HISTORY

BY

WATERMAN THOMAS HEWETT, A.B., PH.D.
PROFESSOR OF GERMAN LANGUAGE AND LITERATURE

VOLUME TWO

FOUNDED A.D. 1865.

THE UNIVERSITY PUBLISHING SOCIETY
New York, U. S. A.
1905

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PUBLICATION OFFICE
41 LAFAYETTE PLACE
NEW YORK, N.Y., U.S.A.

The Cornell University.

First Annual Commencement,

THURSDAY, JULY 1st, 1869.

Primus.

MUSIC.

The Lord's Prayer	Pronounced by the Rev. Dr. Wilson.

MUSIC.

In Hoc Signo Vinces	George Frederick Behringer. *New York City.*
The Civil Sabbath Law,	Morris Buchwalter. *Chilicothe, O.*
Three Hundred Lawyers,	Joseph Benson Foraker. *Hillsboro, O.*

MUSIC.

Influence of the Press,	Charles Fitch Hendryx. *Cooperstown.*
Ancient and Modern Education,	James Kirkland. *Kalamazoo, Mich.*
A Plea for the Artist,	John Andrew Rea. *Lancaster, Pa.*

MUSIC.

The Ultimate End of Civilization,	Dudley Ward Rhodes. *Marietta, O.*
Class Representation,	Oscar F. Williams. *Livonia.*

MUSIC.

Award of Prizes for the Year 1868-9.

Address to the Recipients of Degrees by the President.

CONFERRING OF DEGREES.

MUSIC.

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CHAPTER I

THE COLLEGE OF ARTS AND SCIENCES

Department of Semitic Languages and Literatures

NO mention was made of the study of Sanskrit or comparative philology in the original plan of organization. Even a prospective place in the course of studies for which provision was made in the university curriculum does not appear.

In the early years Dr. Wilson had occasionally, for a limited time, a student in Hebrew, who purposed to enter the ministry. Dr. Roehrig enlarged his field of instruction in French by giving lectures in Chinese and Japanese.

These were frequently attended by large classes who enjoyed the skill and ease with which these difficult subjects were taught by the professor, whose marvelous memory enabled him to dispense with text-books. Seldom has an equal acquisition been obtained with so little effort. Students who knew no Latin or Greek, and to whom French and German proved insurmountable, acquired with the greatest ease a certain knowledge of the bewildering characters on a tea chest, and even read simple tales and fables from the blackboard. These exercises seem to have been a recreation to the learned professor, and to have occupied at first only one hour a week.

The first mention of Oriental instruction occurs in the Register for 1869, where instruction in Hebrew by Professor Wilson, and in Sanskrit by Professor J. M.

Hart, was announced. In the following year instruction in Chinese by Professor Roehrig, and in Persian by Professor Fiske, and in the science of language, for classical students, by Professor A. S. Wheeler. In the Register of 1874-75, under the title " Living Asiatic and Oriental Languages," courses in Persian, Turkish, Chinese, Japanese, Sanskrit, Hebrew, and other Semitic languages were mentioned. The conservative statement appears: " For a thorough appreciation of any literature a knowledge of the language in which it is written is indispenable." It was hoped that interest in these studies would warrant the establishment of classes in Arabic, Syriac, and other languages cognate with Hebrew, and that Semitic philology in its widest sense might find a home in the university. The enthusiastic professor announced in the Register for 1877-78 an elementary course of two years in Chinese, and lectures on Mantchoo, Turkish, the Tartar languages, and Turanian philology. Some instruction in Sanskrit was given, and we find Chaldee and Syriac added to Hebrew under the charge of Professor Wilson. The Register for the following year contained systematic courses in Sanskrit, Arabic grammar, modern Arabic, Persian, Turkish, Malayan.

The existence of this department was due to the eminence of Professor Roehrig, who early won distinction in these studies, and who found pleasure in continuing them. The instruction was not co-ordinated with the courses in classics, and did not contribute to genuine philological study. Few students had the requisite preparation for their successful pursuit, and upon the resignation of the professor the department came to an end.

In March, 1874, Mr. Joseph Seligmann of New York offered to endow a professorship of Hebrew and Oriental literature and history in the university for three years, on condition that he should nominate the incumbent. The offer was accepted, the appointment being rather in the nature of a lectureship, the duties of which required residence at the university, while a course of ten, twelve, or twenty lectures was given. It was expected that this appointment would fill an important deficiency in the university curriculum, as scientific instruction in Hebrew was desired. Dr. Felix Adler, who was nominated to this chair, was a graduate of Columbia College and of the University of Heidelberg, a man of fresh scholarship and of pronounced opinions on the history of religion, philosophy, and ethics. Dr. Adler possessed great ability as a lecturer. He was an independent thinker and possessed the power of clear and eloquent statement, and attracted for a time many hearers. The expectation of systematic instruction in the Semitic languages was not realized, as Dr. Adler's lectures were devoted rather to the origin and history of the various religions of the East, to modern philosophy in its relation to religion, and to Hebrew religion and literature from a critical standpoint. Dr. Adler's lectures were given in the years 1874-76.

A chair of the Semitic Languages and Literatures was established in 1896. The Hon. Henry W. Sage offered to meet the cost of this department for two years. Professor Nathaniel Schmidt, who for eight years had occupied such a chair in Colgate University, was called to organize the new department. His labors began in the fall of 1897. The work, as outlined by him, included instruction in all Semitic languages and dialects, and also in Egyptian, courses in Oriental history, and lectures on Semitic literatures, with particular attention given to the Sacred Writings of the Hebrews and of the Early Church.

During the last eight years students have actually received instruction in Classical and Talmudic Hebrew, Phœnician, Classical and Modern Arabic and Ethiopic, Syriac, Aramaic in its various forms, Assyriac, and in Egyptian. Advanced work in Semitic epigraphy has been carried on in the Semitic Seminary. The Semitic literatures have been studied partly in the original languages with careful use of the necessary exegetical apparatus, partly in English translations. Repeatedly the entire field of Biblical literature, including the Old Testament, the New Testament, the Apocrypha, and the Pseudepigrapha of both Testaments, has been covered in lectures presenting both the literary and religious character of these writings, and the results of modern critical study of their origin, date, authorship, and composition. Throughout these years lectures have been given on the history of India, Persia, Anatolia, Asia Minor, and Syria, including the later history of the Jews, Arabia, Abyssinia, Egypt, and the Caliphates of Damascus, Bagdad, Egypt, Northwestern Africa, and Spain. The lectures have in each case been based on study of the original sources, so far as they have been accessible, and have dealt not only with the political fortunes and social development of these peoples, but also with their religious ideas, customs, and institutions. They have been illustrated by maps, lantern slides, and casts. A series of outlines, including very extensive bibliographies, has been prepared and published by the professor for the use of his classes.

During these years the library facilities have been greatly increased. In addition to the Anthon, Bopp, and Zarncke collections, and the historical library of ex-President Andrew D. White, rich in religious literature, special mention should be made of the collections more recently received. The library of August Eisenlohr, the famous Egyptologist, was purchased for the university. It is rich in works of Egyptology and Assyriology. A large collection of works for the study of modern Arabic has been given to the university by Professor Willard Fiske. By the annual appropriation and special grants it has been possible in a comparatively short time to make the library both efficient for ordinary purposes and useful for the investigator.

While the number of students, naturally, has not been as large as in universities having a theological department, it compares very favorably with those universities of the first grade that have a school of theology. Among these students there are a few who give promise of eminence in their respective fields. Some have left the university to continue their studies in Christian or Jewish theological seminaries, others have gone directly to their work as teachers or preachers. One of the recent graduates of this department, Mr. Albert T. Olmstead, won the fellowship of the American School for Oriental Studies in Jerusalem, and is now in Syria pursuing topographical and epigraphical work under the direction of Professor Schmidt. Two other students in this department have been admitted to graduate work in the school in Jerusalem. The university has recognized the importance of this archæological work in Syria by giving its annual support to the school, which is supported by a number of American universities and theological seminaries, and is practically under the same management as the schools in Athens and Rome. Professor Schmidt himself has been appointed by the Committee of Managers as director of the school for the year 1904-05.

Professor Schmidt was born in Hudiksvall, Sweden, in 1862. His secondary education was obtained in the real-skola, and in the gymnasium of his native city. In 1882 he entered the University of Stockholm, and for two years devoted himself particularly to botany, biology, and mathematics. In 1884 he came to America and entered the Hamilton Theological Seminary, from which he graduated in 1887, at the same time receiving the degree of A. M. from Colgate University. After serving a year as pastor of the First Swedish Baptist Church of New York City, he became associate professor of Semitic languages and Hellenistic Greek in the Hamilton Theological Seminary. The year 1890 Mr. Schmidt spent on leave of absence pursuing advanced studies in Ethiopic, Assyrian, Arabic, and theology at the University of Berlin, and in December of that year he was elected to a full professorship of Semitic Languages and Literatures in the Hamilton Theological Seminary and in Colgate University, a position in which he continued up to the time of his appointment here. Mr. Schmidt is a member of the American Oriental Society and of the Society for Biblical Literature and Exegesis.

The Greek Language

At the opening of the university provision was made for instruction in the classics by the election of Professor Albert S. Wheeler as professor of both Latin and Greek. Professor Wheeler was a graduate of Hobart College, in which he had been tutor from 1853 to 1855, and assistant professor of Greek and Latin in 1855 and 1856. During the years 1857 to 1859 he held the professorship of rhetoric and elocution. From 1860 to 1868, the date of his call to Cornell University, he was professor of the Greek language and literature. All students of those early days will recall this admirable teacher. Having received a legal training for practice at the bar, he manifested the results of this training in all that he did. An excellent and accurate scholar, with a judicial mind, he manifested similar qualities as a teacher. His students were expected to be thorough, systematic, logical, to take nothing for granted, to search for the foundations of all that was taught. For three years he filled the double chair of Latin and Greek. All students who graduated under him felt the impress of his personality as much as of his learning. While the philological side of classical study was not disregarded, he appreciated classical study from its humane side for the value of its literature. Especially in the award of prizes Professor Wheeler pursued a characteristic method. He did not believe that prizes should be awarded simply for excellence in the ordinary curriculum of the classroom, but that in addition to classroom work, certain work should be set which would test the independence of the student by private study. Thus at an examination in Horace, the prize paper would embrace the entire writings of the poet, and the student would be expected to discuss thoroughly from independent research whatever questions might arise in connection with the life and times of the poet, his verse, and his theories of poetry. On one occasion of this kind one competitor committed to memory three books of the " Odes of Horace," and the " Ars Poetica "; and a second student was only slightly behind the first. Professor Goldwin Smith, with whom the poet had been a favorite study, and who had translated a considerable portion of his poems which have since been published, prepared the paper set for examination, such as would have been given in a similar case in an English university, and awarded the prizes. Professor Wheeler resigned after three years' service and accepted a position in the Sheffield Scientific School, where the same distinguished ability as a scholar won for him deserved recognition.

But even the brief period he spent at Ithaca was sufficient to enable him to impress upon the classical work at Cornell a definite character for excellence and to establish for his successors lofty standards of scholarship and teaching. An early student writes of him: "He was a gentleman of extraordinary ability, rare accuracy of scholarship, great personal charm, and with a power of inspiring students with a love for work in classics that was at that time recognized, and that up to the present I hear frequently referred to by his old students of that time." From another source comes this anecdote: "Recently, two gentlemen were seated side by side at a banquet held in New York City. One of the two expressed his great indebtedness to one of his Cornell teachers, whom he described as possessing a rare gift for inspiring students with high ideals. The other replied that he had known just such a man in a small college in the center of the state of New York. Upon comparison the teacher of both proved to have been the same,—Albert S. Wheeler."

Upon the resignation of Professor Wheeler the department was divided, as had been originally contemplated whenever the resources of the university should permit, and Mr. Isaac Flagg, an assistant professor in Harvard, was chosen professor of the Greek language and literature. Professor Flagg was a teacher of fine literary taste, with an intimate knowledge of Greek literature, who, in his published writings, has devoted especial attention to the dramatists. He remained associated with the university until 1888, when he resigned and accepted a position in the University of California. Dr. Benjamin Ide Wheeler, a graduate of Brown University and an instructor in Harvard University, was elected acting professor of classical philology and instructor in Latin and Greek, and entered upon his duties beginning with the year 1886. Professor Wheeler's work upon receiving his degree at the University of Heidelberg had won immediate recognition as a most valuable contribution to the study of the Indo-European languages. He had devoted especial attention to the science of language as well as to the comparative grammar of the Indo-European languages. With his accession, a department was filled the needs of which had been long recognized by all professors in the department of languages. Systematic courses of lectures upon the science of language, together with instruction in Sanskrit and phonetics, with increased work in the department of Greek, to which Professor Bristol was elected from Hamilton College, gave an enlarged impulse to classical study in the university. At this time seminary instruction was introduced in all departments, facilities having been afforded by the purchase of special libraries for consultation by advanced students, and by the fitting up of seminary rooms.

The extension and reorganization of the work in Greek associated with the advent of Professor B. I. Wheeler included a rearrangement of the courses of instruction, the introduction of the study of historical grammar and the science of language, systematic instruction in ancient life and institutions, the organization of seminary work, and the formation of seminary materials, including a museum of casts.

The courses of instruction were remodeled with a view to sharply differentiate between the required work of the freshman and sophomore years, and the elective work of those who looked forward to specialization in Greek. To the work of the freshman year training in the accuracies of the language upon the basis of Lysias, Plato, and the Odyssey of Homer was especially assigned. The work of the sophomore year was devoted almost exclusively to literary training, based upon the reading of Demosthenes, Sophocles, and Aristophanes. Supplementary reading outside the regular requirements of the class exercises was assigned and required. In the belief that these earlier years demanded the most experienced instruction, the work of the sophomore class was conducted by Professor Wheeler himself, and that of the freshman class supervised, and, for at least half the class, conducted, by Professor Bristol.

The variety and scope of the advanced work were also greatly enlarged. Regular advanced courses were provided in the tragedians, Aristophanes, the orators and historians, the lyric and epic poets, Plato, Aristotle, New Testament Greek, modern Greek, Greek composition, history of Greek literature, private and political antiquities of the Greeks, Greek historical grammar, and Greek dialects. Besides these the seminary offered opportunities of studying the Greek inscriptions or, in alternate years, some selected author.

In historical grammar, courses were given in general philology, Indo-European comparative grammar, elementary Sanskrit, advanced Sanskrit, including reading of the Vedas, Balto-Slavic grammar, and old Bulgarian grammar. The purpose was to provide the teacher of language with a fundamental equipment for understanding the phenomena of speech, and at the same time to prepare the way for specialization for those who should choose it.

The course in Greek life and institutions was given in alternate years, and was the first course of the kind given in the university. Illustration by means of the lantern and the various illustrative objects which had been collected was highly serviceable in making ancient life real and the literature living.

Since 1887 a seminary library of great value has been in use. The nucleus of it was procured through the bounty of Mr. Henry W. Sage, who gave one thousand dollars for this purpose. It was the first seminary library founded at Cornell. The seminary is doing an important work in training teachers and specialists.

The outfit of the Greek lecture rooms was purchased from university funds in 1887 and 1888, and the Museum of Arts, purchased and equipped at a cost of over fifteen thousand dollars, was opened to the public on the eightieth birthday of its donor, Mr. Sage (January 31, 1894). This museum was the completest of its kind connected directly with any educational institution in the country. In connection with the formation of the museum and the opportunities of instruction afforded by it, the chair of archæology and art was erected in 1891. Professor Alfred Emerson was called to fill it. The selection of the casts and their successful installation was largely his work. He gave lectures in archæology, the history of sculpture and the history of painting, the topography and archæology of Athens and Attica, and of Pagan Rome, and in Greek and Roman mythology and religion. Professor Emerson prepared a valuable historical catalogue of the museum. He resigned in 1898, and was appointed professor in the American School of Classical Studies in Athens, and later was engaged by the University of California in the purchase of collections of ancient sculpture in Europe for that institution, and in classifying and cataloguing the same.

Assistant professorships of ancient languages have been held by Horatio Stevens White (1876-78), David Walter Brown (1878-79), William Rufus Perkins (1879-82), and George Prentice Bristol (1888-90), associate professor (1890-98), and since as professor. He acted as head of the department for two years following Professor Wheeler's resignation. Professor Bristol, in addition to his courses in Greek, has assumed a part of the work of Professor Wheeler in the science of language. He has also given courses in the development of Attic oratory, Athenian legal antiquities, a teachers' course in Homer, Plato, and Protagoras, and in the Greek lyric poets, historical Greek grammar, general introduction to the science of language, comparative grammar of the Greek and Latin languages, the essential principles of the life and growth of language, and in elementary Sanskrit.

Mr. Louis Dyer of the University of Oxford filled the position of acting professor during Professor Wheeler's absence (1895-96). By Professor Dyer's lectures upon Greek tragedy, his studies in Greek literature and religion, as well as in public readings and interpretations of Greek authors which he inaugurated, classical study received a charm which showed its beauty and value as an instrument of modern culture.

Professor J. R. S. Sterrett of Amherst College was elected head of the Greek department, March 23, 1901, as the successor of Professor Wheeler. Professor Sterrett had won most distinguished honor by his archæological explorations in Asia Minor. With rare courage and patience, and almost heroic sacrifice, he had for years conducted expeditions, the object of which had been to discover and translate the ancient inscriptions of this region and to fix the topography of cities, rivers, and states. So valuable were the results attained that Professor Mommsen, in writing his great work on the "Provinces of the Roman Empire," based his descriptions of the limits of this region largely upon the explorations of Professor Sterrett. The great map, published by the German Government, states that it is based upon Professor Sterrett's explorations.

Professor Sterrett has given courses in myths of the epic cycle; and of the Theban and Dionysiac cycles, art mythology, Greek life, the elegiac and lyric poetry, epinician and idyllic poetry, Greek tragedy, lectures on Greek literature, physical and historical geography of Greece, political and legal antiquities of the Greeks, and Greek epigraphy.

Dr. A. C. White has given for many years a valuable course in the Greek of the New Testament.

Dr. Forman has given courses marked by fine scholarship and literary sense in Lysias, Homer, and Plato, Aristophanes, the orations of Thucydides, and the Attic orators.

Dr. Andrews, who distinguished himself while a member of the American school in Athens by brilliant investigations on the Parthenon, at present instructor in archæology and curator of the Museum of Casts, has given courses in Greek archæology, the history of Greek sculpture, Pausanius, the sources of our knowledge of Greek topography, and in modern Greek.

Dr. Hammond, though connected with the Sage School of Philosophy, conducts work in the Greek department, giving courses in the philosophy of Plato and Aristotle.

The Department of Latin

According to the first Register, Latin alternated with Greek for the first two trimesters of the freshman and sophomore years, while the third trimester of these years was divided evenly between Greek and Latin. In the third year provision was made for daily work in both languages. The fourth year was devoted to Whitney's *Science of Language* and to the study of the comparative grammar of Greek and Latin.

The work in Latin for the freshman year embraced Horace's *Odes* and Livy, along with Roman history and Latin syntax, as expounded in Zumpt's manual. The sophomore year was devoted to Plautus, Terence, Cicero, the history of Roman literature, and Latin syntax. In the junior year, courses were offered in the *Satires* and *Epistles* of Horace, in Persius, Juvenal, Cicero, the *Annals* of Tacitus and Lucretius.

This programme of the first year appears substantially unaltered for the next two years. The work must have expanded somewhat during this period, for an assistant professor of Latin, Bela W. MacKoon, was appointed for the year 1870-71, who, in addition to his work in German, gave instruction in certain classes in Latin, a subject to which he had especially devoted himself abroad.

Upon Professor Wheeler's resignation, Professor Tracy Peck, a graduate of Yale, was appointed to the chair of Latin. Professor MacKoon, who had given instruction in Latin in addition to his work in German, now confined his instruction entirely to German, and for the first five years of his tenure Professor Peck alone gave all the instruction offered in his department. Up to this time the study of Latin had not been continuous in the first two years of the course, but had alternated with Greek, each year being divided equally between the two classical languages. Professor Peck introduced the Roman pronunciation of Latin and the plan of continuous work in Latin for the freshman and sophomore years. He also substituted Latin courses for the courses in general linguistics and comparative grammar which had previously been offered in the senior year, and exercises in Latin conversation. The four years' course as then planned was as follows:

First Year: Fall Trimester, Livy (Selections); Winter Trimester, Cicero *(Essays* and *Letters);* Spring Trimester, Horace *(Odes* and *Epodes).*

Second Year: Fall Trimester, Horace *(Satires* and *Epistles);* Winter Trimester, Quintilian *(Books X* and *XII);* Spring Trimester, Tacitus *(Agricola* and *Germania).*

Third Year: Fall Trimester, Plautus and Terence;

CLASSICAL LANGUAGES

Benjamin Ide Wheeler (1886-1899)

Charles Love Durham

Herbert Charles Elmer

Winter Trimester, Cicero *(Orations* or *Dialogues);* Spring Trimester, Juvenal and Persius.

Fourth Year: Fall Trimester, Pliny *(Letters)* and Tacitus *(Annals);* Winter Trimester, Lucretius and Virgil; Spring Trimester, Catullus.

This study of the authors was accompanied by exercises in Latin composition and by lectures on the languages, literature, and antiquities.

The foregoing arrangement of the work of the Latin department continued unaltered throughout the nine years of Professor Peck's incumbency of the Latin chair. As the work of instruction increased, it became necessary to secure an assistant, and in 1876 Horatio S. White, who, since his graduation from Harvard in 1873, had been studying and traveling in Europe, was appointed assistant professor of Latin and Greek.

When Professor Peck left Cornell to become professor of Latin at his *alma mater* in the fall of 1880, he had brought his department to a high state of efficiency. His personal influence upon his students was strong and wholesome, and is gratefully remembered by all his old pupils. The fullness and exactness of his knowledge is emphasized by those who recall his Cornell teaching. To the last he always took the freshmen for the opening term, though he might have delegated this work to an assistant. In his advice to students concerning the pursuit of Latin, he was always most frank, urging those to abandon the study who seemed unfitted to profit by its pursuit. Many even of those who wished to continue the work, he felt constrained to exclude from his classes when, upon fair trial, they proved unfit to continue the work with profit. As a teacher, though kindly he was keen and unsparing. A former pupil writes: "Every class hour was an examination. Each of us stood in turn, and for perhaps five minutes—it seemed at least a half-hour,—he turned us inside out. Nothing that could tell on the subject in hand but was detected and turned to account, no shallowness or trickery but was ferreted out and exposed. Never had I found such incentive to study a subject, instead of merely preparing a lesson."

Students were always welcome at his home, and he even visited them at their rooms. Not infrequently he gathered the members of a class at his house. He has recently in a private letter borne testimony to the students of those early days. The earnestness and eagerness they exhibited are still fresh in his memory.

Professor Peck was succeeded by Professor William G. Hale, who, at the time of his appointment at Cornell, was holding the position of Latin instructor in Harvard College. For the first two years after his appointment Professor Hale was assisted by Assistant Professor Perkins. In 1882 Professor Perkins was transferred to the department of history, and his place was taken by Mr. John C. Rolfe, who held the post of instructor from 1882 to 1885. Later appointments were those of Andrew C. White (instructor 1885 to 1889), Frank M. Bronson (instructor 1889 to 1892), and Herbert C. Elmer, who, during Professor Hale's absence in Europe (1888-89), was in charge of the department, and after Professor Hale's return continued his connection with it as assistant professor.

For the first six years after his appointment, Professor Hale continued in the main the same courses that Professor Peck had taught. One or two slight changes in the authors read were made from time to time. Thus Tibullus and Propertius were sometimes offered, and the work in Silver Latin was supplemented by the reading of selections from Suetonius, Velleius, and Martial, as well as from Juvenal, Pliny, and Tacitus.

Of more significance, particularly from the pedagogical point of view, was the establishment in 1885 of a four-hour course announced as " Translation at Hearing." " The purpose of this course," to quote from the Register for 1885-86, p. 45, " which is open only to students who have given evidence at the entrance examinations of more than average knowledge and ability, is to prepare such students to read ordinary Latin with ease and speed. A methodical study of the structure of the Latin sentence in connection with grammar, is made in the classroom, and a written exercise in translation at first hearing with formal questions set for written answers at one point after another in the progress of the sentence is given weekly, the aim being to lead the student to grasp the thought in the order in which the Roman sentence develops it, with the final result of his gaining power to read continuous pages of Latin of moderate difficulty, and understand without translating as he reads." .

Professor Hale's enthusiasm for this method of instruction led him to publish a pamphlet strongly advocating this form of teaching.

This course was reduced to a two-hour course the following year, and to a one-hour course the year after, It was thus retained while Professor Hale stayed at Cornell, but despite the conviction and enthusiasm which Professor Hale threw into the work, the results anticipated in the announcement do not seem to have been realized to any substantial extent.

In this same year (1885-86) President Adams's administration began, and in the reorganization of work incident to that event, the teaching of Roman history was entrusted to the department of Latin. Mr. A. C. White did this work for the next three years, when he accepted a position in the library.

The year 1886-87 marks a radical reorganization of the Latin work of the university. For that year Professor Hale announced a course in early Latin in connection with Allen's *Remnants;* a course in Roman private life, illustrated by photographs and lantern views; a course for teachers, consisting of introductory lectures on the relation of preparatory and university work in Latin, and on the order of arrangement and method of work in the former; a brief survey of Latin syntax, with reference to the needs of young students at various stages of their preparation. With this was combined practical illustrative work in Cæsar and Cicero, conducted by the instructor and members of the class. Other courses enriching the work in Latin, and now offered for the first time, were the Latin Seminary, organized for the study of unsettled problems in Latin syntax, including investigations, lectures, and the preparation of papers by the members of the Seminary; further, a course on Roman art, embracing the study of pottery, coins, engraved gems, painting, sculpture, and lastly, a course on the study of Latin grammar in its phonology and inflectional system. This course was offered by Benjamin Ide Wheeler, who came to Cornell this year as acting professor of classical philology and instructor in Latin and Greek, the richness of whose scholarship and the inspiring character of whose teaching gave additional force to the growing life of the department.

The courses of instruction as outlined above continued essentially unchanged throughout the remainder of Professor Hale's connection with the University.

In 1891 Alfred Emerson, at that time professor of Greek at Lake Forest University, was appointed associate professor of classical archæology at Cornell. Professor Emerson relieved Professor Hale of the work in Roman art; he also enriched the work in Latin by offering courses on Roman topography and archæology, and upon Roman religious antiquities.

In Professor Hale's teaching the emphasis was laid chiefly upon the syntactical phenomena of the Latin language. He himself was an ardent follower of Delbrück of Jena, and elaborated for Latin syntax the important principles laid down by Delbrück for the syntax of Greek and Sanskrit. During the last six years of his Cornell teaching, the work of the Latin Seminary was centered about the problems of Latin modal syntax, particularly the uses of the subjunctive.

Professor Hale's own published work in the field of syntax was an important feature of his tenure of the Latin chair. His *Cum-Constructions,* published in two parts (1887-89), as the initial volume of the newly founded *Cornell Studies in Classical Philology,* gave a final example of syntactical method as applied to a most difficult problem, established the reputation of the author as the foremost American investigator in this field, and gave at once great prestige to the Cornell Latin department.

Graduate work in the field of classics thus became a reality at Cornell under Professor Hale. It had naturally been slow in developing. In the early years of the university the duties of the Latin professor had been so onerous that the undergraduate work alone had constituted a heavy burden. To add to this labor the duties of offering advanced instruction would, with the existing staff of teachers, have been impossible. No mention of graduate courses in Latin is found until 1883-84. The Register for that year (p. 86) states that a graduate class working under the direction of the professor of Latin would meet once a week. The work was announced as follows: "Latin accent, and the critical reading of Plautus, with special reference to the following: meter and prosody, grammar, etymology of words and forms peculiar to Plautus, textual criticism, history of early Latin comedy."

Prior to 1883-84 there had been graduate students registered as engaged in the pursuit of the " ancient languages," or the " classical languages and literatures." The first of these seems to have been Miss Ida B. Bruce, in 1877-78. Four years later (1881-82) we find the names of Frank C. Whitney, Gertrude B. Harlow, and Mary M. Pitcher. From this time on there is no year in which there is not at least one graduate student in Latin. Before regular graduate work in Latin was offered, resident graduates had worked in undergraduate courses, supplementing these by lines of study pursued privately under the advice of the professor.

In 1884-85 the graduate work was extended to a two-hour course, embracing critical work in Livy and lectures on Latin grammar, including methods of teaching. Beginning with 1886-87 the graduate work in Latin was announced as a Seminary. It was regularly a two-hour course, and usually dealt with unsolved problems of Latin syntax. Owing to the very small number of graduate students of Latin (usually only one or two), undergraduates of good attainments were admitted to the Seminary. In fact the majority of the Seminary at this time consisted of juniors and seniors.

Professor Hale resigned his chair at the close of the academic year 1891-92, to accept the headship of the Latin department at the University of Chicago. He was succeeded at Cornell by Professor Charles Edwin Bennett, a graduate of Brown University and at the time of his appointment professor of classical philology in that institution. He had previously held the chair of Latin at the University of Wisconsin from 1889-91. Professor Elmer still retained his connection with the department, and Homer J. Edmiston was appointed instructor.

The department grew rapidly in numbers. The registration had been 180 in 1891-92. Ten years later it had increased to over 500. This necessitated additions to the teaching staff. Mr. Charles L. Durham, then Fellow in Greek and Latin, succeeded Mr. Edmiston as instructor in Latin in 1897. He at once proved his unusual capacity for the work of instruction, and in 1901 was promoted to an assistant professorship. Meanwhile a new instructorship had been added by the appointment of Mr. Charles N. Cole in 1899, and still another by the appointment of Mr. Clinton L. Babcock (Cornell, 1895) in 1901. Mr. Babcock secured a Fellowship in the American School of Classical Studies at Rome for the year 1902-03, and was given leave of absence for that year. His place was taken by Professor Alfred Gudeman, recently of the University of Pennsylvania. At the same time Mr. Cole accepted a call to the chair of Latin at Oberlin College, and Dr. John C. Watson, Ph. D., Harvard, 1902, was appointed as his successor. Dr. Babcock resumed his work in the autumn of 1903, and the university was fortunate in being able to retain the services of Dr. Gudeman for another year.

Without discontinuing any of the excellent courses so long in existence in the department, it has been found possible with increasing demand gradually to enlarge the scope of instruction and the number and variety of courses offered. Particularly successful in the way of more elementary courses have been Latin 2, a course in rapid reading, varied in alternate years, and Latin 8, a course in the less read Latin poets, as Tibullus, Propertius, Phædrus, Martial, Catullus, etc. The Teachers' Course has been expanded from a one-hour to a three-hour course. To the course on Roman Private Life has been added one on Roman Political Antiquities. The increase in the number of graduate students has made it possible for a number of years to restrict the membership of the Latin Seminary to the stronger graduate students, while graduate students of less maturity are taught in a Pro-Seminary. Advanced undergraduates are also admitted to the Pro-Seminary, which is conducted one year by Assistant Professor Elmer, and in alternate years by Assistant Professor Durham. Professor Elmer has also devoted himself with signal success to instruction in writing Latin, conducting one course for juniors and seniors, another for graduates. Dr. Durham has established an excellent course in Latin epigraphy, taken by graduates and advanced undergraduates. He also conducts a journal club, the members of which read weekly one of the German philological periodicals. Dr. Babcock the past year has given an admirable course on Roman and Etruscan art and archæology.

In the way of graduate work Professor Bennett conducts the Latin Seminary. Plautus and Horace are studied in alternate years. Besides reading these authors with his students Professor Bennett conducts weekly meetings in the minute work of textual criticism and critical interpretation. Additional courses for graduates given by Professor Bennett are in historical Latin grammar, a systematic study of sounds and inflections, historical Latin syntax, history, scope, and aim of Latin studies.

The Cornell Studies in Classical Philology, begun in 1887, have been maintained by the publication of six volumes in the field of Latin; two are by Professor Bennett, one by Professor Elmer, and four by graduate students who have taken the degree of Doctor of Philosophy.

Germanic Languages

Mr. Willard Fiske was elected professor of the North European Languages, and we may assume that by this action the chair of modern languages was definitely divided as originally contemplated. Professor Fiske was born in Ellisburg, N. Y., November 11, 1831. He removed in early boyhood to Syracuse, where he formed a lifelong friendship with Mr. Andrew Dickson White, later president of the university. He entered Hamilton College in the autumn of 1847, where he remained until December, 1848, when a boyish escapade severed his connection with the college. Among his intimate college friends at this time was Mr. Charles Dudley Warner, who entered college one year later, and who was his roommate and lifelong friend. Senator Joseph R. Hawley of Connecticut, with whom Professor Fiske was later intimately associated, graduated in the year in which Professor Fiske entered. The young scholar conceived soon after a passion for the study of Icelandic, and found his way to Vermont in order to see Mr. George P. Marsh, the eminent philologist and diplomatist. Filled with a boyish enthusiasm, he undertook a journey to the north of Europe, and matriculated as a student on October 14, 1851, in the University of Upsala, in Sweden. Here he spent two semesters, participating thoroughly in that Norse life which had such a fascination for him, an interest which he retained throughout his life, determining in part the direction of his studies and the occasion of one of his great collections. He passed through Germany on his return, and upon arriving in this country received the appointment of assistant librarian in the Astor Library. Here he remained for several years, but failing in promotion, as he anticipated, he resigned and accepted the appointment of secretary of the American Geographical Society. Later he became a journalist and was for a time one of the editors of the Syracuse *Journal* in his native city, and later one of the editors of the Hartford *Courant,* then owned and conducted by General Joseph R. Hawley. At the time of his appointment he was in Europe engaged in reporting the opening of the Suez Canal. A man of great enthusiasm, a charming conversationalist, with the power of winning and retaining friends, he has had at different times various enthusiasms. He collected at one time the largest chess library in America, and organized the first chess congress, at which Paul Morphy, the greatest name in the history of chess, appeared as a young man and won such distinction. Mr. Fiske also established the *Chess Monthly*. His experience as a librarian, and his familiarity with the languages of Northern Europe, suggested him as a suitable man for librarian of the university and as professor of the Norse languages, but he assumed for a time the professorship of German as well. He entered upon his duties in January, 1869. The professors of these early days had little of the conventionalities of the traditional scholar of the New England colleges. Most of them had been educated in Europe and were familiar with the academic life of many countries. They brought, therefore, to their work a freshness and variety of experience not shared always by teachers of the older colleges. There was a free intercourse between professors and students, a charming relationship which has remained unbroken from the first. There was little of the pedagogue in that early group of scholars which gathered here. Professor Fiske was of a fresh and vigorous personality. His career as an editor had given him a wide acquaintance among public and literary men. His journalistic experiences found expression in the life of the new university. He was the unofficial reporter of the various events which happened in the academic world for the metropolitan press. He furnished the college papers with material, frequently writing notes and often editorials. All students found him their friend, and throughout his life the companionship of young men was a delight to him. The students who made his acquaintance in those early days always bore a delightful memory of his frank and familiar companionship. Every interest which affected the student world sought his advice and co-operation. He looked indulgently upon the various student pranks of that early time. To him, they constituted an essential feature of youth as well as of student life. In the midst of his busiest work he always had leisure for friendly interruption and genial companionship. His absence from the university began in the summer of 1878, and he gave little continuous instruction afterwards. After the death of Mrs. Fiske he resigned (1881) and resided permanently abroad. He occupied at San Doménico, on the heights between Florence and Fiésole, the villa formerly owned by Walter Savage Landor. This early villa, the tower of which and a portion of the walls dated back to the thirteenth century, he refitted with rare luxury. A little stream that flowed through the grounds is mentioned by Boccaccio. From the windows can be seen Fiésole with its monasteries and Etruscan walls, with the Valley of the Arno and the cathedral of Florence in the distance. Here he welcomed scholars of every clime and dispensed the most generous hospitality. He was a natural bibliophile, and he collected a library of books relating to Iceland and Old Norse literature of about eight thousand volumes, another relating to Petrarch of about five thousand volumes, and a third, relating to Dante, of seven thousand volumes; the last he presented to Cornell University during his lifetime. The Icelandic and Petrarch libraries were bequeathed to the university in his will, as well as the residue of his estate.

The work in German at the opening of the university was organized by Mr. Thomas Frederick Crane, at that time a young lawyer in Ithaca, who was engaged temporarily in the absence of Professor Fiske for the fall term. Mr. Crane, at the expiration of his engagement, found the literary enthusiasms awakened by his brief contact with the new university stronger than his love for his legal studies. He therefore resolved to abandon his proposed career as a lawyer and prepare himself for the profession of a scholar. He sailed in January, 1869, for Germany. The next year and a half was spent in Germany, Italy, Spain, and France.

Dr. James Morgan Hart, who taught French first (1868-69), then French and German (1869-70), was transferred from the department of South European languages to that of North European languages, at the opening of the university year 1870. He remained connected with the department during the two following years (1870-72).

The large increase in the number of students which began with the opening of the third year of the university caused additional assistance to be necessary, and on September 10th of that year, Mr. Waterman Thomas Hewett was elected first assistant professor of the North European languages, and Bela P. McKoon second assistant professor. The department was then fully constituted with one professor and three assistant professors.

The instruction in language in these early days was limited in amount, and translation was confined to the reading of a few of the leading dramas in German literature. There were no lecture courses, no historic German, no comparative grammar, and no seminaries for investigation. The preparation of students in German in the high schools was limited in amount and of doubtful value, hence few of those who entered were prepared to pursue advanced studies in German. There were large freshman and sophomore classes.

One delightful feature of the early instruction was the courses of lectures by Mr. Bayard Taylor, which were originally prepared for this university and have since been published. The fame of Mr. Taylor as a traveler and a poet, his interesting personality, the charm of his conversation, the range of his acquaintance and of his interpretation, attracted the student world. His adventures made him a hero, and lent an additional interest to his lectures.

The class of 1879 presented a bronze medallion of Bayard Taylor by the sculptor Albert Harnisch to the university, which was unveiled in the Chapel on June 6th of that year.

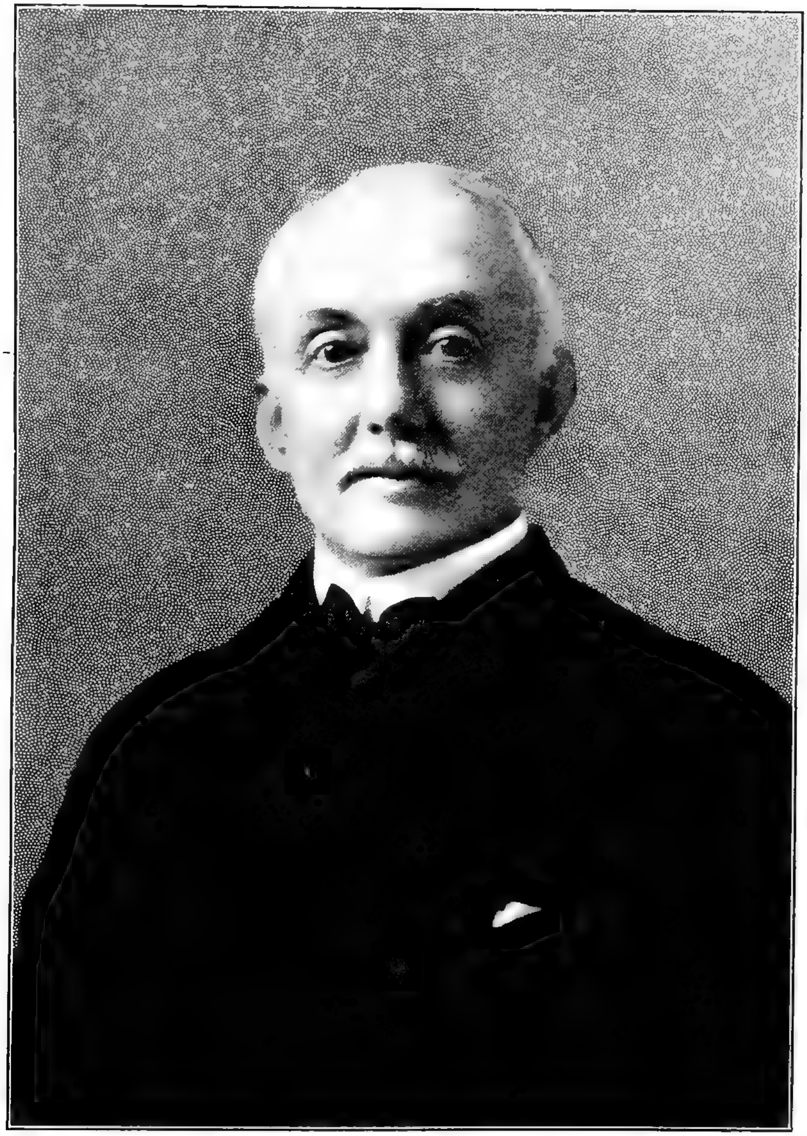
Upon the resignation of Professor James Morgan Hart in 1873, Mr. Hjalmar Hjorth Boyesen was appointed assistant professor of the North European languages, and three years later professor of German literature. Professor Boyesen was a Norwegian and a delightful lecturer upon German literature, possessing in a marked degree the Norse gifts of narration and story-telling. The charming personal confidences into which his auditors were introduced was a familiar feature in his lectures. He was a frequent writer for the magazines, and a popular novelist. One of his novels is based upon university life at Cornell, *The Mammon of Unrighteousness* (1891). He resigned in 1880 to accept a position in Columbia University. He however returned for two years to deliver a course of lectures upon German literature.

In the year 1877, during the absence of Assistant-Professor Hewett in Europe, Mr. Horatio S. White, of the classical department, took a large part of his work, and on January 25, 1879, owing to the continued ill-health of Professor Fiske, he was elected assistant-professor of German for one year, an appointment subsequently continued. Professor White graduated at Harvard University in 1873. He studied law and traveled in Europe during the next three years, completing his legal studies during his instruction in classics at Cornell, and was admitted to the bar (1878). Of untiring energy, systematic in work, pre-eminently adapted for clerical and committee work, by a passion for detail and administration, he became dean of the university faculty in 1896, a position which he retained until 1902, when he was called to Harvard University. His interest in athletic pursuits made him for many years a valuable adviser in this side of university life.

In 1883 two professorships of German were established, to which Professors Hewett and White were elected. The department, as thus constituted, so continued until Professor White's resignation in 1902. Professor Hewett introduced the study of Gothic, Old and Middle High German, and the study of historical grammar of the Germanic languages. He also gave courses in the Dutch language as well as in classical German literature and the literature of the nineteenth century.

A German seminary for the study of special authors or periods of literature is formed annually. The main purpose of such a seminary is to train to habits of original investigation, and to impart a rigid discipline in the methods of criticism and in literary judgments. A similar Teachers' Seminary is formed for the review of the general principles of advanced grammar, elementary phonetics, historical and comparative syntax, lectures on etymology, and the study of synonyms, the development of poetical forms, meter, and the characteristics of German style, and the discussion of the theories of instruction in the modern languages.

Professor White gave courses in Wagner, with the interpretation of the musical motives of his operas,



WATERMAN THOMAS HEWETT

also in the Romantic School, the Minnesingers, and occasionally in historical German.

In the autumn of 1903 a German society was formed bearing the name of the Deutscher Verein, composed of advanced and graduate students, the object of which should be to cultivate the spoken language and the literature. Meetings are also held for social purposes, and there are musical evenings, evenings devoted to lectures in German and to German conversation. German plays are performed in the spring of each year.

In June, 1904, Dr. J. A. Walz, instructor in Harvard University, was elected a professor of German.

The department has an unusually large collection of lantern slides, about fifteen hundred in number, to illustrate the study of German literature, containing views of manuscripts, pictures of authors, texts, and characters and scenes in German literature and history, as well as in German life and art.

The department has had upon its German staff many instructors who have won deserved distinction in other institutions.

Of eighteen instructors in German who have been connected with Cornell University, fourteen have received appointments to professorships or to an advanced position in other colleges or universities, one returned to Germany, and three are still connected with the university.

Among these are James Owen Griffin (1885-91), Professor of German in the Leland Stanford University; Julius W. Krüger (1883-85), in the Adelphi College; Charles Bundy Wilson (1886-88), in the University of Iowa; H. Schmidt-Wartenberg (1887-88), Assistant-Professor in the University of Chicago; Theodore Henckels (1887-91), in Middlebury College; William Edward Simonds (1888-89), in Knox College; Camillo von Klenz (1891-93), Associate Professor in the University of Chicago; William Austin Adams (1891-93), Assistant Professor in Dartmouth College; Howard Parker Jones (1893-99), Professor in Hobart College; Lewis Addison Rhoades (1893-96), in the University of Illinois and in Ohio State University; George Burridge Viles (1896-1904), Assistant Professor in Ohio State University; Marcus Simpson (1898-1900), Assistant Professor in the Northwestern University; Robert James Kellogg (1892), Professor of Modern Languages in Milliken College, Illinois; James Percival King (1902-03), in Williams College.

The Romance Languages

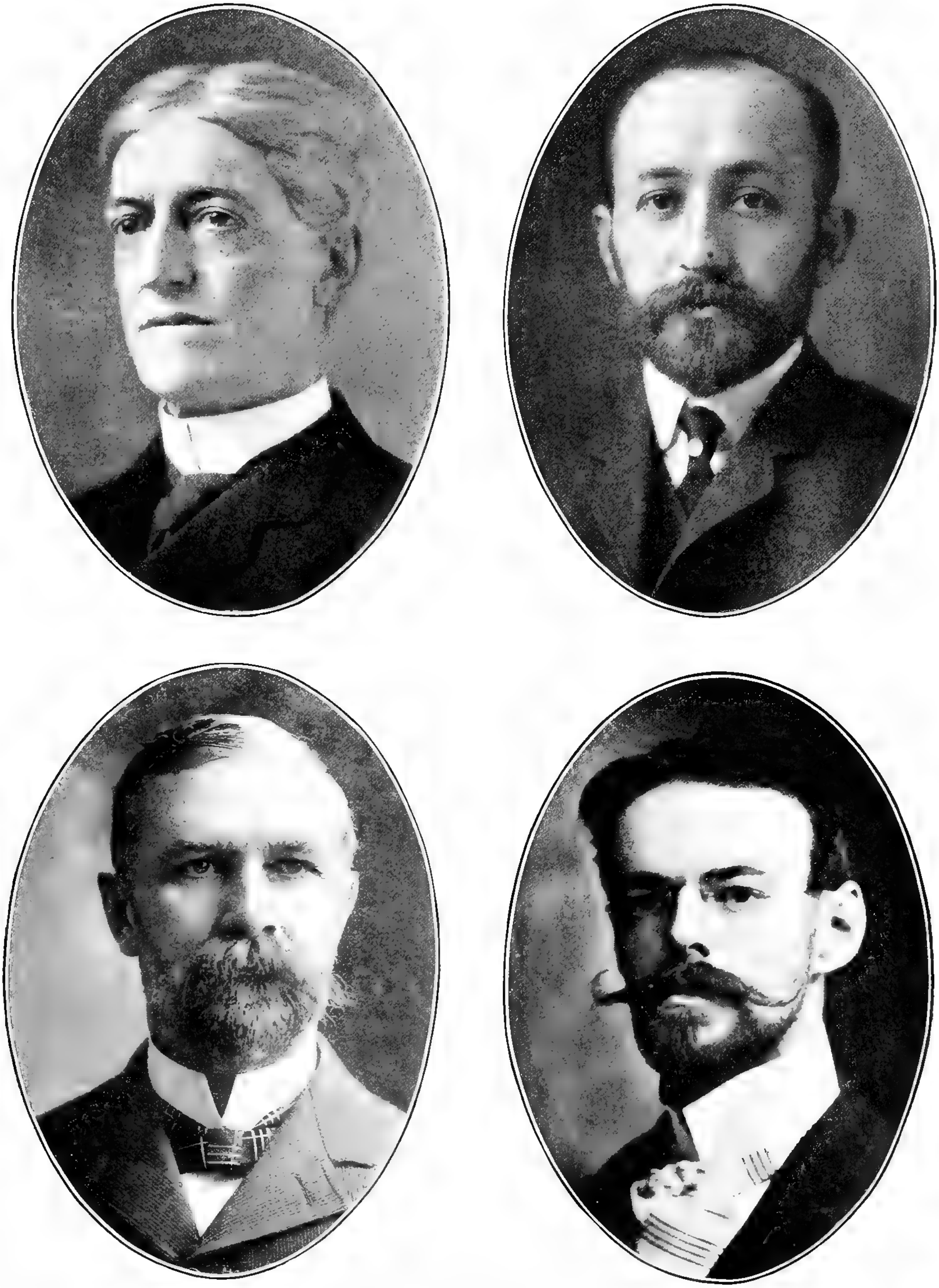
The first professor of languages in this department chosen was one of the two professors first elected in the university. William C. Russel was elected at the fifth meeting of the Board of Trustees held in Albany, February 13, 1867. He was elected to the chair of modern languages and adjunct-professor of history. It is not clear whether it was the original purpose to combine the two chairs at first proposed, viz., that of the South European languages and of the North European languages, which were provided for in the plan of organization, in one chair by this designation or not. Professor William C. Russel was a nephew of the famous William Channing whose name he bore. He was a graduate of Columbia College in the class of 1832. After graduation he was admitted to the bar and engaged in the practice of his profession in New York until 1863. At that time there came a sudden and painful interruption in the practice of his profession, occasioned by the death of a beloved son who had entered the army as an officer in Colonel Shaw's regiment of colored troops and had been killed in battle. In order to recover his body he went South. Later his philanthropic spirit led him to take service in the

Freedman's Bureau, and, for a brief period, he gave instruction in the department of metaphysical, moral, and political science in Antioch College. After his election to the chair of modern languages in Cornell University he went abroad to familiarize himself with the present state of modern literature in the department to which he had been elected.

The first assistant professor in the department was James Morgan Hart, who was transferred in 1870 to the department of German. Mr. W. M. Howland, a graduate of Harvard, and later a practicing lawyer in New York, also served in the department until the close of the second year.

Dr. F. L. O. Roehrig, a German by birth, and a graduate of the University of Halle, served as assistant professor from 1869 to 1884. Professor Roehrig was a man of great versatility and familiar with very many languages. His earliest interest had been associated with the Turkish language, and for a time he had filled the position of assistant secretary to the Turkish Legation in Constantinople. Here his marvelous memory and devotion to whatever study he undertook gave to him rapidly a command of several of the languages spoken in Constantinople. He published later a Turkish Grammar, for which he received decoration of the order of the Mejidkeh from the Sultan. After leaving Constantinople, several months were spent in Athens in the study of modern Greek, and for a number of years he was a teacher of languages in Paris. Here also he studied medicine and won distinction as an oculist. He was attached for a time as acting assistant surgeon to several United States Army posts in the Northwest. His indefatigable energy caused him to acquire several Indian dialects. Two buffalo robes upon the floor of his study bore witness for many years to the generosity of certain Indian chiefs who had been flattered by his knowledge of their languages. Many interesting contributions to the Indian dialects were made by him, which were published by the government in Washington. After the revolution of 1851, he visited England and finally came to this country. Many of the university publications of these early days contained quaint contributions filled with out-of-the-way lore, relating to foreign languages and peoples, which he contributed. Those who studied with this gifted and genial teacher of French, will recall his endless kindness, his bitter disappointment at the failure of their efforts to master the pronunciation and the grammar which he aspired to teach. His German pronunciation of English was always an amusing commentary upon his efforts to impart the true pronunciation of French.

Mr. Thomas Frederick Crane, who had spent eighteen months in Germany, Italy, Spain, and France, returned from his studies in April, and in the following June received a permanent appointment as assistant professor of French and Spanish. Professor Crane graduated at Princeton in 1864, where his natural literary gifts were recognized by an appointment as one of the editors of the *Nassau Literary Magazine*. He was also the ivy orator of his class. He was admitted to the bar in 1866, and was later a clerk to the Board of Supervisors in Ithaca, and an assistant in the office of the collector of internal revenue. During this period he took up the study of German, French, and Spanish, and in the summer before the opening of the university he acted as secretary to the Hon. F. M. Finch, and to Mr. Cornell. Upon the opening of the university in October, 1868, Mr. Crane was temporarily engaged to give instruction in German until the arrival of Professor Willard Fiske in December. This brief period revealed to him the possibility of a life which appealed



MODERN LANGUAGES AND SCIENCE OF TEACHING

Thomas Frederick Crane
Charles De Garmo

Othon Goepp Guerlac
Guy Montrose Whipple

to his literary tastes more strongly than the legal life upon which he had entered. He sailed in January for Germany, where he spent several months.

Professor Crane was elected professor of Spanish and Italian in 1874, retaining at the same time the assistant professorship of French. He has since added courses in the earlier dialects of French, including Old Provençal, also in the philology of the Romance languages. One of his most successful courses is in Dante. Upon the resignation of Professor Russel in 1881, he was placed at the head of the department, the title of which was changed to that of Romance Languages and Literatures in 1882. Professor Crane's earliest contributions to the languages to which his life has since been devoted were mainly in the direction of folklore. He is the author of *Italian Popular Tales* (1885), and editor of an edition of the *Exempla, or Illustrative Stories,* from the *Sermones* of Jacques de Vitry, also of several text-books for the study of French literature, notable for the originality displayed in his selection of materials and for the careful and varied scholarship shown in the notes and introductions; among these are: *Tableau de la Révolution Française, Le Romantisme Française, La Société Française au Dix-Septième Siècle, Chansons Populaires de la France,* Boileau's *Les Héros de Roman.*

Mr. Alfred Stebbins, at one time principal of the Ithaca Academy, was also appointed assistant professor of French, which position he filled until 1882.

Mr. Everett Ward Olmsted of the class of 1891, after a brief period of study abroad, was appointed instructor in French (1893-95). After extended studies in France and in Italy, he returned to the university as instructor in French (1896). In 1898 he was promoted to an assistant professorship. Professor Olmsted has exhibited great enthusiasm in the study of the Romance languages. His mastery of spoken French is remarkable. He has spent several summers in Spain, and under his direction, aided by the enthusiasm for Spanish study which has followed the Spanish-American War, Professor Olmsted has had the largest classes in Spanish in the history of the university. Many advanced pupils and instructors in the department of Romance languages have attained distinction and are now filling prominent educational positions in other institutions.

Mr. Othon Guerlac received the appointment of instructor in French in 1900, and in 1904 he was promoted to the rank of assistant professor. Mr. Guerlac's acquaintance with French literature, and especially with the life and literature of the French capital at the present time, a delicate literary sense, and a graphic power of description have been illustrated in numerous contributions to French and American reviews which have attracted wide attention. Mr. Guerlac's work is mainly in modern French literature, and includes courses in the modern French drama, the French literature of the nineteenth century, and the French prose writers of the nineteenth century.

English Literature and Philology

Among the professors whose names appear in the first catalogue of the university is that of Homer B. Sprague as professor of rhetoric, oratory, and vocal culture. There is no mention in this title of English literature, although instruction in it was assumed by the professor. Professor Sprague had had a brilliant career in Yale, where he had won many of the highest honors of the college. Later, with characteristic ardor, he entered the army and attained the rank of colonel. Upon his return from the war he abandoned the career at the bar for which he studied upon leaving college, and became principal of the Oread Institute in Worcester, Mass. Colonel Sprague was a man of brilliant gifts, and an attractive, popular lecturer. The study of English literature as arranged by him was as follows: The leading authors were to be studied in their historical order during the first year. In the second year, the authors were to be studied in groups, periods, and departments. The origin, structure, growth, and peculiarities of the languages were to be explained and illustrated. In the third year there was to be a critical examination and study of masterpieces of the great authors. In the fourth year there were to be lectures by the professor on special topics. In rhetoric there were to be exercises in writing, the analysis of sentences, the principles of composition, original essays, the scientific study of rhetoric based upon an analysis of the masterpieces of the best authors. This was to be accompanied by specimen orations or essays. In oratory the elements of expression by voice and gesture were to be taught, and much time devoted to vocal culture. Declamations were required. Speeches were studied and analyzed to ascertain the ideas, sentiments, and emotions, and apply the principles of expression, and finally the delivery of extemporaneous orations and lectures upon oratory and orators. The labor accompanying any adequate fulfillment of such a course, in a department where every student required individual attention, was enormous. This was especially true when the requirements for admission were so unsatisfactory as in those early days. No provision was made for instruction in Early English or in English philology. Professor Sprague resigned at the end of two years to accept the presidency of the Adelphi Academy, and Professor Hiram Corson was elected on June 30, 1870, as professor of rhetoric.

Professor Hiram Corson

No department at Cornell has been so long and so closely identified with a single man as that of English literature with Professor Hiram Corson. Professor Corson was not, it is true, a member of the original faculty; nor did he at once devote himself solely to that field of work which was to be so peculiarly his. It was in 1870 that he was called to the chair at Cornell which bore the name of Rhetoric and Oratory, and which had theretofore been held by Professor Homer B. Sprague; and it was yet another year before the coming of Professor Shackford relieved him from the care of these less congenial branches, leaving him only that field of the English language and literature which now received formal recognition in his title. He was, however, already a man in his prime, whose personality had from the first given direction and character to his work.

Born in Philadelphia, November 6, 1828, of an old and cultivated family, he had received his earliest schooling in his own home, where his father, a mathematician of exceptional ability, had especially trained him to mathematical thought; and it was not until he was a lad of fifteen that he was sent to the Treemount Seminary at Norristown, Pa., where, at the classical and mathematical school of the Rev. Dr. Samuel Aaron, and later at the classical school of the Rev. Dr. Anspach, at Barren Hill, a few miles from Philadelphia, he spent five years in study, distinguishing himself by his mathematical attainments and skill, and by his knowledge of Latin and Greek.

In the fall of 1849, now a man full grown, he entered on active life. Betaking himself to Washington, he utilized his knowledge of stenography by connecting himself with the reporting corps in the United States Senate, for a time serving also as private secretary to

Senator Lewis Cass, then a leader in our national politics. It was a tempting life for a young man, but in the summer of 1850 he became connected with the library of the Smithsonian Institution, then under the vigorous direction of the distinguished bibliographer, Professor Charles Coffin Jewett. As Professor Jewett's lieutenant, not only in the cataloguing of the Smithsonian and the Congressional libraries, in accordance with the plan which originated with Professor Jewett for the separate stereotyping of titles, but in the great undertaking—alas! then premature—of a general catalogue for the libraries of the whole country, the young scholar received a thorough training in bibliography and in library management; but what stood him in yet better stead and gave a final shaping to his career was the opportunity, during the six or seven years of his connection with the Smithsonian, of attending the courses of literary and scientific lectures then given by distinguished scholars and men of science. Stimulated by these, and greatly aided by his connection with the library, he now gave all his leisure to the careful study of the great modern literatures—the English, the French, and the German. It was a schooling well calculated to make a man of his powers the ripe and independent scholar he now began to show himself; and his marriage, in September, 1854, with Mademoiselle Caroline Rollin, a lady of French birth and European education, with a deep interest in English, French, German, and Italian literatures, must have strongly stimulated his literary trend.

In 1859, removing with his family to his native city of Philadelphia, he became a public lecturer on English literature and kindred themes, drawing to his audiences many of the most cultivated people of the Quaker City, and gradually associating himself with its literary and educational enterprises. He was an active and prominent member of the Philadelphia Shakespeare Society, in which the now distinguished Shakespearian, Dr. Horace Howard Furness, received his first great impulse in the study of Shakespeare. Recognition did not long tarry. In 1864 Princeton (then known as the College of New Jersey) conferred on him its degree of Master of Arts; and in the following year Girard College, in Philadelphia, elected him to its chair of moral science, history, and rhetoric. This post, however, carried with it the *ex-officio* vice-presidency of the college, and, finding the attendant duties too burdensome, he resigned it after a single year to accept the more congenial professorship of rhetoric and English literature in St. John's College at Annapolis, Md. There, in 1870, Cornell found him.

Such was the somewhat unusual training which fitted Professor Corson for his long and fruitful career at Cornell. For some years after his coming, much of his attention was devoted to the history and philosophy of English speech. His earliest volume, a critical edition of Chaucer's *Legende of Goode Women,* published in 1863, had given him high place among students of language. One of his first tasks at Cornell was the completion, for his classes, and publication, of his well-known *Handbook of Anglo-Saxon and Early English* (1871), begun two years before in St. John's College. He had previously devoted the leisure time of several years to a *Thesaurus of Early English,* whose completion was impatiently awaited by scholars. But, devoted and able as were his labors in this field, it was to literature rather than to language that his heart was given. The *Thesaurus* was never completed.

In 1878 St. John's College conferred upon him the degree of Doctor of Laws.

In due time, at his own wish, he was relieved of the elementary instruction in Anglo-Saxon, and although, on the retirement of Professor Shackford in 1886, the instruction in rhetoric and oratory fell again for a time under his general charge, it received from him only supervision, and the coming, in 1890, of Professor James Morgan Hart, and the provision for separate instruction in oratory, freed him not only from these branches but from the whole linguistic side of his subject.

It is with his work as a teacher of English literature that Professor Corson is most familiarly associated, and by it he will perhaps be longest remembered. Possessed not only of a great breadth of culture and of a rare discrimination, but of a voice of exceptional range and singular sympathetic power, he has been an interpreter and inspirer of no usual order. The subtler shades of feeling and of thought have found in him a revealer of profound insight and consummate skill, and luminous comment has reinforced the sympathetic music of his interpreting voice.

To an institution whose trend toward the practical and the immediate was so marked as Cornell's, and especially in the early days of her cruder and more aggressive enthusiasms, it was a rare feature to possess in Professor Corson so potent an expositor of all that is classic and abiding in English letters. For more than a generation of human life he stood foremost among his colleagues as a spokesman of the higher interests of the soul; and in every class which went out from Cornell he kindled something of his own noble love of literature, of his sensitiveness to the ideal, of his contempt for the merely material in act and life.

Yet it would be gravely to mistake his significance to treat his influence as purely or even mainly conservative. However appreciative of the old, no one was ever more impatient of mere convention. Old and new alike he brought to the bar of an individual taste as fearless as it was searching. No venerable imposture escaped his scorn; no seer-eyed heresy failed of his welcome. If he stood eminent as an expounder of the acknowledged masters—a Chaucer, a Spenser, a Shakespeare, a Milton, a Tennyson,—he was none the less one of the earliest to recognize and applaud the more rugged genius of a Browning; and no one has more effectively maintained the pre-eminence of his message to modern life. Of his *Introduction to the Study of Robert Browning's Poetry,* the poet wrote him: "Let it remain as an assurance to younger poets that, after fifty years' work unattended by any conspicuous recognition, an over-payment may be made, if there be such another munificent appreciator as I have been privileged to find; in which case let them, even if more deserving, be equally grateful." Nor, despite his subtle sense of English rhythm, has anyone more vigorously championed the inspired lawlessness of a Walt Whitman.

Counting himself the expositor not less of the subject-matter of literature than of its forms, few things there are within the range of his literary studies on which the flash of his revealing insight has not played.

It is the wealth of personality and of suggestiveness which have perhaps meant most to Professor Corson's students. It is not so much as a skilful catechist or as a patient censor of the callow work of beginners, still less as an organizer of that microscopic molework which has too much monopolized the name of science, but as an emancipator and inspirer, that his work as a teacher has been brilliant. What he has sought from his students has been understanding and sympathy rather than fellow-work. Though eager for the signs of response, his forte has always been monologue. If this temper has sometimes been abused by clever laziness or imposed on by vacuous adoration, it has made his influence far broader than his seminary or than even his vast classes. Many a one to whom a lecture or a reading by Professor Corson was but an incident—possibly but an accident—in college life looks back to him as the source of a lasting inspiration. Even that mystical philosophy of life for which he has found fewest disciples, and which has sometimes even amused those too indolent to understand it, has helpfully broadened many horizons.

Nor has his influence at Cornell been restricted wholly to those who have sat in his lecture room. A figure and a bearing as picturesque and individual as his character have made him at all times a marked element in the university's life. His views and his utterances have been matters of common parlance. His younger colleagues in particular have felt in no small measure the inspiration of his personality and the emancipating influence of his thought.

No summary of Professor Corson's work at Cornell could approach completeness without mention of the gracious part in it played for so many years by Mrs. Corson—" Madame Corson "—as, mindful of her French birth and spirit, her friends loved to call her. Pre-eminently social by nature, and adopting with full heart her husband's country, she brought to him not only a rare intellectual sympathy but to the little world of his colleagues and his students a breadth of traveled experience, a refinement and grace of manner, a knowledge of books and of men, and a facile charm of conversation which made " Cascadilla Cottage," the Corson home, a yet more radiant center of culture. Herself a ripe student of literature, she often, too, by her evenings with Browning or with Dante, as by her

French Conversaziones, lent a more concrete supplement to the work of the classroom. Till the illness which culminated in her death, May 21, 1901, she being in her seventy-third year, her part in the university's life was never a passive one. Her last literary effort was a translation of Pierre Janet's psychological work, *État mental des hystériques: les stigmates mentaux et les accidents mentaux,* which she finished but a month or two before her decease, and which her husband saw through the press.

Professor Corson's activity as a teacher has at no time been confined wholly to Cornell. Both by other institutions of learning, such as Johns Hopkins University and the University of Wisconsin, and a widely scattered general public, the demand for courses of lectures or for single addresses and readings by him has been a large and growing one. A yet wider public he has reached by his multiplying books, not to mention his many magazine articles and minor papers; his *Jottings on the Text of Hamlet* (1874), *The University of the Future* (1875), *The Idea of Personality and of Art as an Agency of Personality, as Embodied in Robert Browning's Poetry* (1882), *Tennyson's Two Voices, and A Dream of Fair Women, with a biography and general introduction and notes* (1882), *An Introduction to the Study of Robert Browning's Poetry* (1886), *An Introduction to the Study of Shakespeare* (1889), *A Primer of English Verse, chiefly in its æsthetic and organic character* (1892), *The Aims of Literary Study* (1895), *The Voice and Spiritual Education* (1896), *Selections from Chaucer's Canterbury Tales, with introduction, notes, and glossary* (1896), (the latter being the required text-book of the Home Reading Union of Great Britain), *An Introduction to the Prose and Poetical Works of John Milton* (1899)—all these have made familiar to a constantly broadening audience his name and his views. And yet more is in prospect from his untiring pen.

At its Commencement in 1903 Princeton University conferred on him the degree of Doctor of Letters.

Old age finds him still hale and fruitful. In 1903, at the ripe age of seventy-five, he retired from the full duties of his professorship, having been made a professor emeritus; but he still retains his activity as a university lecturer, devoting his larger leisure to engagements abroad and to the work of his pen.

Professor Corson had been for many years a devoted student of English literature. His contributions to the study of Anglo-Saxon, and individual texts in early English which he had edited, had already won for him deserved recognition both in this country and abroad. With his coming, the systematic study of Anglo-Saxon was introduced. In 1871 the department was still further enlarged by the appointment of Charles Chauncey Shackford, whose work lay more in the field of rhetoric and general literature. Professor Shackford was a representative of the literary culture of New England of the time of the new birth of literature in the middle of the eighteenth century. Intimately acquainted with the great writers of that period, educated as a clergyman and interested in philosophy and religion, he was a type of the thought of that time. Small of stature, active, the friend of the student, he impressed all as young in feeling, though the record of time was against him. His work in rhetoric and oratory left the deeper impression on the university world. His lectures on general and comparative literature, scholarly and critical as they were, did not appeal to the average student. His interest in the university papers and in the intercollegiate contests of the time was always kindly and encouraging, and his assistance generous and valuable. Professor Corson was thus enabled to devote more immediate attention to English literature, while the work in rhetoric, and lectures in general literature, including the philosophy of literature, with a discussion of the various forms of the literary product in various nations, fell to Professor Shackford. Of Professor Corson we may say there was a unity in the aim of his department and of the work embraced under it from the beginning to the present time. He valued the study of literature for the spiritual activity which it may be made to induce, and for the resulting refining influences. Through his books upon Shakespeare and Browning he was recognized as one of the greatest interpreters of literature whom our country has produced. To him was due in a large degree the intelligent study of Browning in various centers, most of which had received his special aid. His elective classes and special extra readings which he gave were always numerously attended. His work received high recognition abroad from the most eminent scholars, from Tennyson himself, Browning and Dowden and Furnival. He had been invited to present papers before the Chaucer, the New Shakespeare, and the Browning societies.

Professor Corson's method of instruction in literature was as follows:

Lectures were given on English literature, poetical and prose, from the fourteenth to the nineteenth century inclusive, in eight groups, of which Chaucer, Spenser, Shakespeare, Milton, Dryden, Pope, Wordsworth, Browning, and Tennyson were made the central figures. Lectures were given daily, except Saturday, and to the same class, so that there were about two hundred lectures and readings given during the academic year. A large portion of the class were special students who had come to devote most of their time to English literature. They were obliged to do a great deal of reading in connection with the lectures. It was made a special object of the lectures to bring the students into direct relationship with the authors treated, and hence much reading was introduced. The literature was presented mainly in its *essential* character, rather than in its historical, though the latter received attention, but not such as to set the minds of students in that direction. It was considered of prime importance that they should first attain a sympathetic appreciation of what is essential and intrinsic, before the adventitious features of literature—features due to time and place—be considered. What is regarded as of great, of chief importance indeed, in literary study, in some of our institutions of learning, namely, the relations of works of genius to their several times and places (called the philosophy of literature), was, in his view, of the least importance, so far as culture in its truest sense is concerned. Literature was thus made chiefly an intellectual and philosophical study; its true function, namely, to quicken the spiritual faculties, was quite shut off. The study of literature should aim to bring the student into sympathetic relationship with the permanent and the eternal—with that which is independent of time and place.

The *mode* in which genius manifested itself, at certain times, in certain places, and under certain circumstances, might be explained to some extent; but genius itself cannot be explained. " Environments stimulate or suppress, they do not and cannot make genius. The causes which bring it nearer to the essential world than men in general are brought, we cannot know. The explanation which can be given of its *mode* of manifestation should be called the physiology, not the philosophy, of literature."

" How is the best response to the essential life of a poem to be secured by the teacher from the pupil? I answer, by the fullest interpretative vocal rendering of it. On the part of the teacher, two things are indispensable, first, that he sympathetically assimilate what constitutes the real life of the poem; second, that he have that vocal cultivation demanded for an effective rendering of what he has assimilated. Lecturing about poetry does not, of itself, avail any more for poetical cultivation than lecturing about music avails, of itself, for musical cultivation. Both may be valuable in the way of giving shape to, or organizing, what has previously been felt to some extent; but they cannot take the place of inward experience. Vocal interpretation, too, is the most effective mode of cultivating in students a susceptibility to form—that unification of matter and manner upon which so much of the vitality and effectiveness of expressed spiritualized thought depend."

"The reading voice demands as much and as systematic and scientific cultivation for the interpretation of the masterpieces of poetical and dramatic literature, as the singing voice demands for the rendering of the masterpieces of music. But what a ridiculous contrast is presented by the methods usually employed for the training of the reading voice, and those employed, as in conversatories of music, for the training of the singing voice!"

Readings were given every Saturday morning throughout the academic year, from English and American prose writers. These were open to all students and to any visitors who might wish to avail themselves of them. The selections read were chiefly such as bear upon life and character, literature and art. The regular members of the class afterwards read for themselves the compositions entire from which the selections were made.

Under Professor Corson there were four English literature seminaries devoted severally to nineteenth century prose not including novels, seventeenth and eighteenth century prose not including novels, novelists of the nineteenth century, and novelists of the eighteenth century. The seminaries were open to graduates, special students, and to undergraduates who had maintained a high rank in the lecture courses.

Frequently twelve plays of Shakespeare were read during the present academic year, so arranged as to occupy two hours each in the reading, and upon one occasion, at least, the thirty-seven plays were read in a regular course. Browning's *The Ring and the Book* was read entire, with appropriate comment, to a select class of graduate and special students who gathered in the evening for that purpose.

The University Senate recommended in 1890 a division of the department of English literature and rhetoric. It was proposed to establish two professorships, to one of which the chair of English literature should be assigned and to the other that of English philology and rhetoric. The department of elocution and oratory was attached to the latter chair.

After the resignation of Professor Shackford in 1886, the duties of both departments again devolved upon Professor Corson, until the election of Dr. James Morgan Hart as professor of rhetoric and English philology in 1890. Professor James Morgan Hart was the son of Dr. John S. Hart, the well-known educator, formerly a professor in Princeton College. Professor Hart graduated at Princeton and afterward received his degree of Doctor of Laws at the University of Göttingen. During his first residence abroad, between 1860-65, he resided in Geneva, Göttingen, and Berlin. Upon his return to this country he entered upon the practice of law, but was soon called to Cornell University as assistant professor of French. He remained here until 1872. From 1874-78 he engaged in literary work in New York and in editing a series of German classics. During this time he published his very interesting volume upon German universities (1874). After residing for a second time abroad, when he devoted himself especially to the study of English philology, he was called to the University of Cincinnati, where he filled the chair of English and German from 1876-90, from which he was summoned again to Cornell University, with which he had been associated in the early years of its history. Since the creation of a special chair for English philology, the work has been systematically arranged and received a large development and growth. Professor Hart has set himself vigorously to elevate the instruction in rhetoric, and especially in elementary English, in which he found the prevailing instruction in the secondary schools of the state very deficient. His services in this direction, both within the university and in the public schools, have effected a revolution in the character of the instruction in this study. He has published *A Syllabus of Anglo-Saxon Literature* (1887), a *Hand-book of English Composition* (1895), *Essentials of Prose Composition* (1902), and numerous critical contributions to English literature and philology.

Professor Hart's special courses have been devoted mainly to English philology, and to the training of teachers for instruction in the public schools. He has given courses of lectures upon the *History of the English language, The grammar of modern English, Middle English philology, The origin and development of English dramatic theories and forms, Old English philology,* and the *Critical study of Layamon.*

Among others who have served in the department of English were Edward Everett Hale, Jr., who was instructor in English from 1886 to 1889, and acting assistant professor from 1889 to 1890, and Edwin Miles Brown, who was acting assistant professor in 1889 and 1890, both of whom served during Professor Corson's absence in Europe.

Dr. William Strunk, Jr., is a graduate of the University of Cincinnati, where he was a special student of Professor Hart, distinguishing himself by his work in English and in German. Dr. Strunk spent the year 1898-99 in attendance upon lectures in the Sorbonne and the Collège de France in Paris, where he received a diploma of Élève de l'École des Hautes Études.

He was appointed an instructor in English in Cornell University in 1891, and assistant professor in 1899. He has edited Macaulay's and Carlyle's *Essays on Samuel Johnson* (1895), Dryden's *Essays on the Drama* (1898), and Cooper's *Last of the Mohicans* (1900).

Professor Strunk has delivered courses upon Germanic philology, based upon Streitberg's *Urgermanische Grammatik,* including courses in Old English and Gothic, also in English prose of the sixteenth and of the seventeenth centuries, in phonetics, and on literary forms.

Mr. Frederick Clark Prescott is a graduate of Harvard, where he was also a graduate student and assistant. He was appointed an assistant professor of rhetoric in Cornell University in 1897. Professor Prescott has given courses in argumentative writing, the development of English literary criticism, in English prose of the eighteenth and nineteenth centuries, and in American literature.

Mr. Clark Sutherland Northrup graduated at Cornell University in 1893, where he received the degree of Doctor of Philosophy for work in English in 1898. He was appointed an instructor in English in 1897 and an assistant professor in 1903. He has given courses in

Old and Middle English, upon the history of the English language, and in elementary English philology. Dr. Northrup has published *A Study of the Metrical Structure of the Middle English Poem, The Pearl* (1897), and *Dialogues inter Corpus et Animam; a fragment and a translation* (1901).

Dr. Oliver Farrar Emerson was a graduate of Iowa College and received the degree of Doctor of Philosophy at Cornell University in 1891. He was appointed instructor in English from 1889 to 1892, and assistant professor of rhetoric and English philology from 1892 to 1896, when he was called to the Western Reserve University.

The requirements for admission in English in 1904 and 1905 are:

One hour of examination is assigned to answering questions upon the books marked *A*. Two more hours are occupied with writing longer papers upon subjects taken from the books marked *B*.

The books prescribed for 1904 and 1905 are: *A:* Shakespeare, *The Merchant of Venice, Julius Cæsar;* the *Sir Roger de Coverley Papers* in the Spectator; Goldsmith, *The Vicar of Wakefield;* Scott, *Ivanhoe;* Coleridge, *The Ancient Mariner;* Carlyle, *Essay on Burns;* Tennyson, *The Princess;* Lowell, *The Vision of Sir Launfal;* George Eliot, *Silas Marner.* *B:* Shakespeare, *Macbeth;* Milton, *Lycidas, Comus, L'Allegro, Il Penseroso;* Burke, *Conciliation with America;* Macaulay, *Essays on Milton and on Addison.*

The examination is not designed to test the candidate's familiarity with the history of English literature or with the minutiæ of the books prescribed, but to test his ability to express himself readily and easily in accordance with the usages of ordinary prose composition. To this end the candidate is urgently advised: *a.* To train himself in writing concise paragraphs in answer to questions upon the most striking narrative and descriptive incidents in the books of the *A*-list. *b*. To study more systematically the contents of the books of the *B*-list, endeavoring to retain a knowledge of each book as an organized whole. This result will be best secured by writing numerous essays or compositions of considerable length upon the general purport of each book. *c*. To cultivate—in all his writing—the habits of correct grammar and spelling (including proper names characteristic of the books read), of correct sentence-structure, punctuation, and paragraphing. *d*. To avoid most carefully the error of believing that the mere oral memorizing of the contents of the books prescribed is the kind of preparation desired. The candidate is expected to learn from these books the art of expressing himself.

In every case the university examiner treats mere knowledge of the books as less important than the ability to write good English.

No candidate markedly deficient in English is admitted to any course in the university.

One of the earliest features of the instruction in English is the introduction of readings from classical English writers, with brief essays based upon the authors read. Courses in the technique of narrative, descriptive, and expository writing, with exercises in paragraphing, essay draughting, and the interpretation of illustrative texts in connection with a handbook of English composition; the preparation of a fixed number of papers of moderate prescribed length, the subjects to be chosen by the students and discussed with the teacher; also in argumentative writing, embracing the exposition of the theory of evidence in literary and historical questions, with practice in the preparation of writing argumentative abstracts and briefs, have constituted a part of the work since 1897.

The requirements for admission in English are also met by passing the examinations of the College Entrance Examination Board of the Middle States.

Oratory and Debate

The teaching of oratory at Cornell University has been under the care of six professors: Homer Baxter Sprague (1868-70), Hiram Corson (1870-71; 1886-87), Charles Chauncey Shackford (1871-86), Brainard Gardner Smith, associate professor (1887-93), Duncan Campbell Lee, assistant professor (1893-1904), and the present incumbent, James Albert Winans, assistant professor, who was appointed in 1904. Professor Corson at various times between 1872 and 1886 conducted exercises in rhetoric and elocution as an adjunct to the teaching of literature. Upon the retirement of Professor Shackford in 1886, Professor Corson was for one year again in charge of the work in rhetoric and oratory, his previous title of Professor of Anglo-Saxon and English Literature being changed in that year to that of Professor of English Literature and Rhetoric, a title which he bore until 1890, when it was changed to that of Professor of English Literature. Professor Shackford's name as "Professor of Rhetoric and General Literature, Emeritus," was borne on the university roll after his resignation, until his death, in 1891.

The department of oratory came into being as an independent division in 1890, when the teaching of English was divided into three distinct but related departments: rhetoric and English philology, elocution and oratory, and English literature. In 1904 the department received the official title of "Oratory and Debate."

The early history of Cornell evinces the interest of the founders in the study of oratory, and their desire to have this study emphasized in the curriculum of the new university. The first report of the committee on organization, prepared by Andrew D. White, recommended the establishment of a professorship of "Rhetoric, Oratory and Vocal Culture," and that the incumbent should be one of the sixteen resident professors. President White had himself won the DeForest prize in original oratory while a student at Yale College, and was firmly convinced by his own experience of the value of training in this art. When he came to recommend a professor for the newly created chair, he chose Homer B. Sprague, one of his college-mates at Yale, who had won for himself a special reputation as a writer and speaker while in college, and who had attracted Mr. White's particular attention by his criticism at the time of the delivery of the latter's DeForest oration, and who, after graduation, had risen to a prominent rank as a popular lecturer.

Professor Sprague began his duties at the opening of the university in October, 1868, as professor of rhetoric, oratory, and vocal culture, the major part of the work in English literature being likewise conducted by him. A four-years' course was planned in each of these subjects.

The study of oratory began with the elements of expression by voice and gesture. Each student was expected to declaim in the presence of the professor. During the second year, students were given masterpieces to analyze, and these were afterwards used as bases for extempore speech. In the third and fourth years, great orations were more thoroughly studied, and original orations written and delivered. Professor Sprague also gave lectures on oratory and orators to members of the senior class.

Professor Sprague resigned his professorship in

1870, and accepted the presidency of Adelphi Academy, now Adelphi College, Brooklyn.

About this time a gift was announced which was destined to exert a favorable influence upon the development of oratory in the university. The Hon. Stewart Lyndon Woodford, a distinguished veteran of the Civil War, and later lieutenant-governor of New York State, requested permission to found a prize in original oratory, modeled after the DeForest prize at Yale. He had seen so much of the good effect of contests for this prize at Yale, that he was anxious to have a similar influence at work in Cornell. He talked the matter over with President White and found the president equally interested with himself. The prize, consisting of a gold medal of the value of one hundred dollars, was established in 1870, and was first competed for by the class of 1871. Thirty-three generations of collegians can testify to the value of the gift of this great friend of Cornell, whose latest words to the students of the university reaffirm the early view, of which his generous gift has been an eloquent exposition: "The necessity of a strong department in English composition and oratory seems to me as great now as it ever has been. So long as men think, they should be able to so express their thoughts in writing and in speech as to instruct, persuade, and convince other men. Words, mere words, should never be an end, but fitting words, fittingly spoken, always have been powerful, and always will be."

Professor Hiram Corson, who succeeded Professor Sprague with the title "Professor of Rhetoric and Oratory," had been professor of history, rhetoric, and English literature at St. John's College, Annapolis, and at Girard College, Philadelphia. The chief work in the wide field of English literature, rhetoric, and elocution, as well as in themes, devolved upon him.

Professor Corson found himself burdened with the multiplicity of these subjects and duties, and with the large number of students taking these courses, and as a result President White recommended in June, 1871, the appointment of an additional professor.

Professor Corson's tastes were more in the line of literature than of rhetoric and oratory. In his Anglo-Saxon courses he had already laid the foundations for the historical study of English, and had in a single year given a marked impulse to the spiritual study of literature, which later he made more effective and lasting by his long and faithful service to the university in the chair of English literature.

Professor Charles Chauncey Shackford was appointed professor of rhetoric and literature before the opening of the university in the fall of 1871. The courses which he announced were: "Composition for the first year, the study of rhetoric from lectures and text-books; for the second and third years, and for the last year, essays, orations, and discussions illustrating rhetoric as an application of logic and æsthetics, and in relation to oratory and the higher forms of literature."

When Professor Corson assumed the professorship of Anglo-Saxon, English literature, and oratory in 1872, he gave special courses in elocution for second-year students, and also had classes in rhetoric. At this time there was no clear distinction in the teaching of the different subjects, such as obtained later. Professor Corson also gave a course in vocal culture and declamation during 1873-74, but the emphasis of his teaching was literature and the vocal interpretation of literature. Professor Shackford also lectured on general and comparative literature, but he laid emphasis upon literary forms, and encouraged the production of original essays and orations, and discussions on the part of the students. Both accomplished good work for the university, but their fields were so vast that it was not to be expected that either could, without assistance, train individually all the men of the university in the art of public speaking as President White had first planned.

In 1878 Mr. William Edward Lucas, who had been an instructor in rhetoric and composition, was entrusted with the work in elocution under the direction of Professor Shackford, and elocution was made for the time being a required subject in all the literary courses. Professor Shackford personally conducted the classes in elocution in 1883-84. From 1880 until 1885 he also gave a course in extempore speaking.

In the spring of 1885 Mr. John J. Hayes was engaged to teach elocution to juniors and seniors, and was at once recognized as a valuable addition to the overworked staff. Mr. Hayes was personally very popular with the students and aroused much enthusiasm for his subject. His teaching was largely personal, and was usually given by private appointment. Two systematic courses were entitled " vocal culture, action, and delivery " and " melody and inflection of speech, gesture, and delivery." Mr. Hayes was an admirable elocutionist and teacher. So great was his success that during the first year of his appointment the senior class of 1886 voted to found a prize in elocution as a class memorial, and to leave as an endowment for it the sum of six hundred dollars. The prize was first awarded in 1887, and has been from the first a great stimulus to good speaking. A large number, sometimes over one hundred, compete in a series of three or four contests, for the honor of being an " 'Eighty-six speaker," twelve being chosen annually from the classes in public speaking to appear in the final competition, which is held in the Armory, and always before a large audience.

Mr. Hayes continued the work in elocution after Professor Shackford's retirement in 1886, during the year when Professor Corson again assumed charge of the instruction in oratory, and until a successor was chosen in 1887. He was afterward a successful instructor at Harvard University.

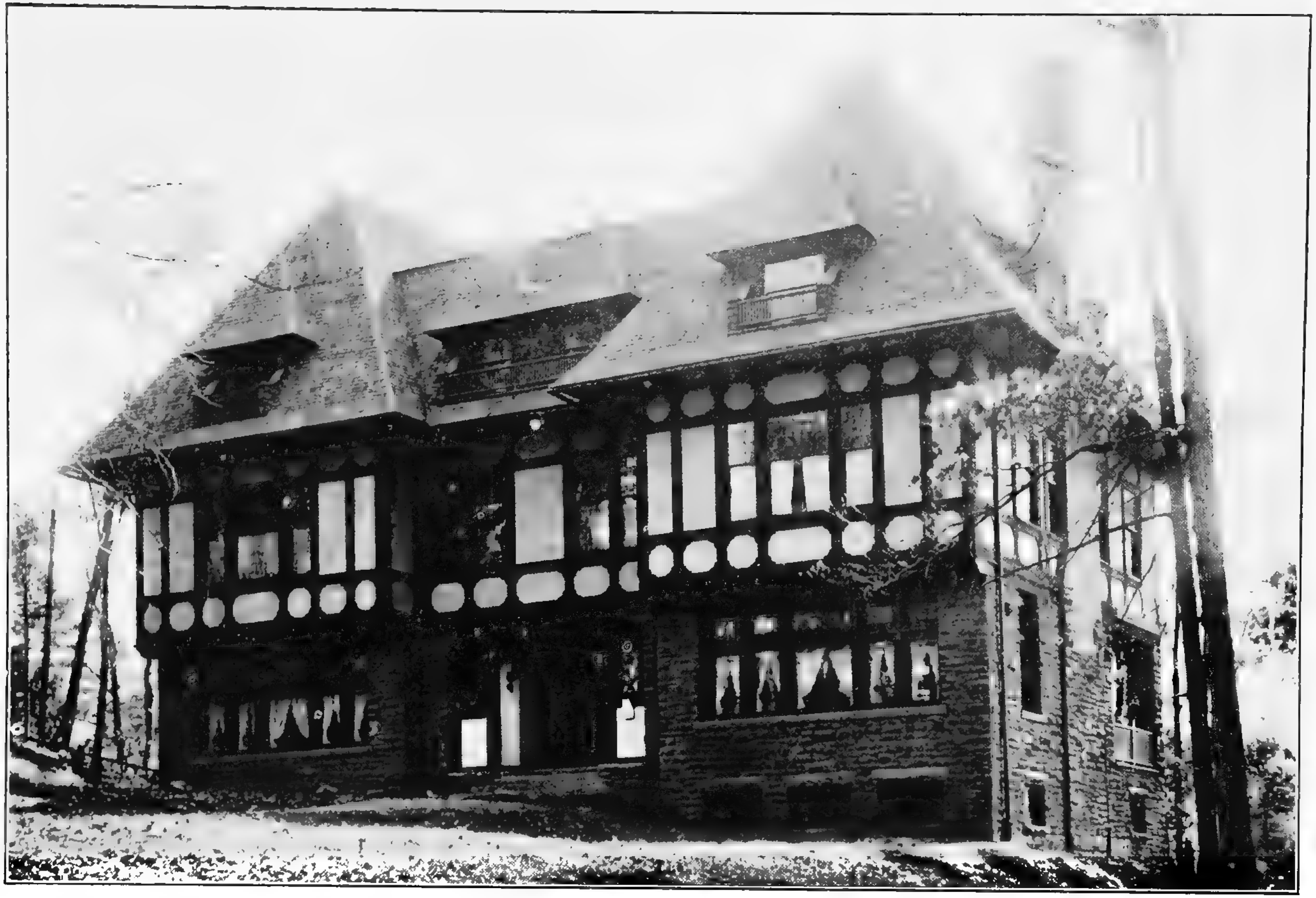
Hamilton College had long had an enviable reputation as a home of oratory, and many Cornell men were of the opinion that the chair of oratory should be filled by some competent Hamilton graduate, trained in the methods of Mandeville and Upson, whose teaching had given that small college its chief prestige. Mr. Brainard Gardner Smith of the class of 1872 of Hamilton College was elected to this position. Mr. Smith had won the famous Clark prize in original oratory while in college, and came to his new work with a fine preparation in declamation and oratory, He had also served a long apprenticeship on the staff of the New York *Sun,* which qualified him to be a good critic, and teacher of those who aspired to write pure English.

Professor Smith introduced at once the Hamilton or Mandeville system of speaking, and it became the standard. The secret of Professor Smith's success, however, lay more in his own practical methods of teaching, in his common-sense criticisms, and in his high sense of the fitness of words, action, and voice in speech than in any system. Professor Smith's text-book, *Reading and Speaking,* which followed the sentential method of delivery, was used for a number of years in the course in elocution, this being supplemented by personal instruction in connection with declamations delivered in class, and before the public. This personal drill and the interest aroused by the new 'Eighty-six Memorial prize in declamation, combined to make the departmental work more successful than ever before.

In addition to the two courses in elocution and oratory, Professor Smith offered during the year 1888-89 a course in journalism. Lectures were delivered on different phases of journalism, and practical instruction was given in the beginnings of newspaper work, reporting, treatment of news, preparing copy for the printer, etc. The class was organized on the plan of the city staff of a large newspaper, and the student was set at practical work. The course was given again during the year 1889-90, and was elected by a considerable number of students, but was discontinued at the end of the year.

Early in 1893 Professor Smith was called back to his *alma mater* as the first incumbent of the newly established Upson chair of oratory. The honor thus conferred appealed to him, and the urgency of friends confirmed his desire to accept the proffered position. He resigned his chair at Cornell in June, 1893.

Professor Smith recommended as his successor, Mr. Duncan Campbell Lee, teacher of Greek and English in Cascadilla School, Ithaca, who was also a graduate of Hamilton College. He had been a prize scholar in his class in Greek, and in English, which included rhetoric and oratory, and had won also prizes in philosophy and Latin. Professor Lee continued the courses of instruction already established, but changed the name of the first from " elocution " to " public speaking," as embodying his own view of the aim of such a course. This new title also expressed the new ideal proper of the department,—not the training of public readers and elocutionists, but of public speakers,—to prepare the student to speak with dignity, force, and grace, and thus enable him to meet as a speaker the various demands of public life.



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There could be, in the view of the teacher, no right speaking without right thinking, and the way to secure right thinking was to enlarge the powers of observation, memory, comparison, and reason. It was, therefore, the aim of the instruction to stimulate originality and individual effort on the part of the student. The training of the speaker should be intellectual, rather than physical, vocal training being sought as an instrument, not as an end in itself; the speaker should be pre-eminently true to his message. The Hamilton method of individual drill was continued. The principles of individuality, knowledge of the subject, and zeal for a message were enforced by the department. The student was assisted in attaining his material, and in the mastery of his subject by following a scheme of interpretation and a system of reports after plans devised by the professor.

The course in oratory previously existing was made more definite by requiring each student to choose a limited field for research at the beginning of the year, and to write his orations from materials gathered in this research. In addition to lectures given on the structure of orations, and on oral discourse, reading conferences were held with the writers of orations, in which criticisms were offered, and the individual's style discussed. Work for the individual was the keynote of this course, as of all the teaching of the department. The orations written by seniors were marked for the practical nature of their themes, and the directness of their treatment. The artificial and broadly general oration was not permitted.

As an advanced course, to follow the year of study and practice of public speaking already outlined, a plan for the thorough training of extemporaneous speakers was originated, which was adopted with enthusiasm by the students, and has since been copied extensively in colleges throughout the West. A distinction was made between impromptu speaking and extempore speaking; it was held that extempore speaking did not mean extempore thinking. Each student was required to prepare an outline of every extempore speech, and this outline had to be handed to the instructor and faithfully followed. A speech was required from every student weekly. A syllabus of topics in the field of American history, economics, and politics was prepared by the professor for students in this course.

To satisfy the demand for thorough instruction in the principles of argumentation, a course in forensics was offered in 1896, which consisted of a study of the theory of argument and evidence, and practical exercises to give facility in the writing of briefs. In subsequent years, oral debates were added for advanced students. One of the reasons for the succession of victories in intercollegiate debating, which came at this time, may be found in the careful training received in the department of oratory in the courses already named, which became subsequently permanent features of the instruction in the department.

After the year 1894, Professor Lee was assisted by one or more instructors: from 1894 to 1899, by Mr. Edwin DuBois Shurter, the successful competitor for the Woodford prize in 1892, now dean of the School of Oratory at the University of Texas; from 1899 to 1901, and during 1903-04, by Mr. James Albert Winans; and from 1901 to 1904, by Mr. William Ross Lee, both graduates of Hamilton College.

During Professor Lee's absence in the year 1901-02, which he spent in study and lecturing at Oxford, England, Mr. Winans was made acting assistant professor, in charge of the department. The present instructors (1904) are Mr. William Ross Lee, and Mr. George A. Everett, a graduate of Cornell in the class of

1900. A portion of the drill work has for several years been conducted by seniors of ability, who are appointed as student assistants.

From 1900 to 1904, Professor Lee gave a course of lectures illustrative of the history of oratory from the earliest times to the present, entitled " Masters and Masterpieces of Oratory."

During 1903-04 he also gave to the students of the college of law a course on " Masterpieces of Legal Argumentation."

A valuable result of Professor Lee's services to the university is found in the numerous debating organizations which now exist. When he was called to the university there was but one debating society in existence, namely, the Cornell Congress, which was founded in 1885, the earlier literary societies,—the Adelphi, the Irving, the Curtis, and the Philalatheian —having previously dissolved. Since 1893, a debating society has been formed during the freshman year in every class, which has continued throughout the course; inter-class and inter-club contests have been held each year; a debate council has been organized, representing faculty and students; intercollegiate contests have been held with two great universities, the University of Pennsylvania and Columbia University, and similar contests between Cornell clubs and smaller colleges and high schools—until an American educator, the president of a leading university, has said that the university has " the best debating plant in the country." The first of the long series of debating clubs, the George William Curtis Debate Club, was formed at Professor Lee's suggestion in 1893; the first intercollegiate debate occurred in 1894; the debate council was his idea; and the series of contests big and little that are now carried off each year found their inception in him. It was chiefly through his efforts and the efforts of a small body of thoughtful seniors in the class of 1894, that the class voted to leave its memorial of five hundred dollars to found the 'Ninety-four Memorial Prize in Debate. There was considerable opposition, but in spite of every objection the plan carried, and has since met unanimous and enthusiastic approval.

The method of choosing the 'Ninety-four Memorial speakers is as follows: About November 15, the debate council announces a question for the first competition. From this competition twenty-four contestants are chosen for a second competition, which determines the eight men to appear in the final contest. The twenty-four men are generally divided into three sections, and a speech of five minutes is required from each man, the side which each man is to defend being announced but five minutes before he is called upon to speak. This method, it will be seen, tends to compel the candidate to read broadly in preparing, and to study both sides of all questions presented, and to debate extemporaneously.

The eight men appointed to debate in the final contest choose sides about a month beforehand. When the choice of sides cannot be arranged by conference, the lot is resorted to. To prevent any collusion between opponents for the sake of rebuttal " effects," it is always required that the men shall prepare their arguments independently. At the opening of the exercises the order of the speakers on either side is determined by lot. Each debater is allowed ten minutes for direct argument, and five minutes for refutation. The prize is awarded to " the most effective debater, account being taken both of his thought and of his expression." The judges are disinterested persons, not acquainted with the participants, and are usually nonresidents of the city. The intercollegiate debaters are generally chosen from the eight 'Ninety-four Memorial competitors.

The organization having all debating interests in charge is known as the Debate Council. This is composed of one representative of each club, two delegates-at-large, who are usually local alumni, and three members of the university faculty, the last of whom are looked upon as advisers rather than as executive officers. The council has authority to arrange and conduct all intercollegiate debates; it also organizes the freshman debaters into a club, usually by means of competition, and exercises a general supervision over all the clubs.

The results of Cornell's first decade of debating have been on the whole most satisfactory. The university has won a fair share of the intercollegiate contests; but, what is far more important than this, a large number of men have received in this work a training which they could not have obtained in any other way, and which must render them vastly more efficient in the performance of their life work, whether at the bar, in the pulpit, in the legislatures, or in private life.

The stimulus to right thinking that this prize has already given to the students of one decade would be hard to measure; when one thinks of the perpetual nature of the prize, Cornell men must be manifoldly thankful to those who made it possible. The reputation the university has won as a debating institution has been in the face of the wider, and, in the popular mind, the adverse reputation it has as an engineering school. Many had thought such a debating spirit as now exists an impossibility. Its growth may be a marvel; it is all the more a source of pride to the friends of the university.

The following half-year courses, all elective, make up the curriculum of the department of oratory in 1904:

Public speaking; brief writing and debate; oral debate, elementary and advanced; extempore speaking, elementary and advanced; formal oratory; the masters and masterpieces of oratory; the masterpieces of legal argumentation. It is safe to say that no college or university in the country offers a more comprehensive or thorough curriculum in oratory and debate than that here outlined.

Professor Lee resigned in June, 1904. The following week this appreciation appeared in the columns of the *Cornell Alumni News* from the pen of his successor, who had been his colleague and close friend for several years:

" By the resignation of Professor D. C. Lee, Cornell loses one of her strongest teachers. In his eleven years of constant service, he has made a deep impression upon hundreds of Cornellians, and regret at his resignation will be sincere and general. He has taught a subject not always respected, and has made it thoroughly worthy to hold its place in a university curriculum. Starting with a determination that his work should be intellectual, he has made war upon bombast, insincerity, and all the disagreeable qualities that elocution has come to suggest, and has insisted constantly that public speaking should be purposeful and sincere, and that good delivery depends primarily upon right thinking. 'Better no speech than a messageless speech.' 'Think while you speak,' and like expressions have been the familiar injunction of his teaching. And the high key-note of his work has been individuality. To his assistants he has said, 'Do not dogmatize'; to his students, 'Do not imitate; be yourself; work out the best there is in you.'

" Those who have watched his work know that, beyond question, his students have learned to speak and to speak well—not in an overdone, 'highfalutin' manner, but in a way that has enabled them to go without mortification into the pulpit, the legislature, or the law court, and meet on equal terms their older rivals.

" But the more thoughtful of his students have been impressed, not so much by the fact that Professor Lee has been developing speakers, as by the fact that he has been educating men. With him, the man is more important than the speaker; rather the speaker is the man. He has stimulated them to think clearly and independently, to study and develop their own powers, to come out of themselves and shake off the effects of the student-repressing lecture system. ' His work has made me want to do something for myself,' said a student recently, and that idea is echoed in many current comments. To this fine result not only his methods have contributed, but also his stimulating personality.

" Professor Lee's work has not been confined to the classroom. For many years he labored efficiently for Cornell athletics as a member of the Athletic Council. He has found time to make himself an influence in the business, religious, and political life of Ithaca, and a factor in the politics of the state. He combines with broad culture, marked ability to do things, and adding to all a generous idealism, he stands as a fine type of the educated citizen.

" It seems probable that the world of practical affairs will claim his energies in the future. But, whatever his work and success, to those who have known him here, he will remain essentially the teacher, and a teacher of the kind that we can ill afford to lose."

Mr. James Albert Winans, instructor in the department, was appointed assistant professor in oratory and debate as the successor of Professor Lee. Professor Winans graduated from Hamilton College in 1897. In 1899 he had been appointed, as already stated, an instructor in public speaking, and during 1901-02 he had served as acting assistant professor. In 1902-03 he was assistant professor of public speaking at the University of California, in charge of the department, but returned to Cornell as a graduate student in 1903.

The Sage School of Philosophy

For the first eighteen years of the existence of the university, philosophical instruction was in sole charge of the Rev. William Dexter Wilson, professor of moral and intellectual philosophy, and also registrar of the university. Professor Wilson was born at Stoddard, N. H., February 28, 1816. He graduated from the Harvard Divinity School in 1838, and became a Unitarian preacher. In 1842, however, he became a member of the Episcopal Church, being rector at Sherburne, N. Y., from that time until 1850. He then became professor of moral and intellectual philosophy at Geneva College (now Hobart), a position which he continued to occupy until 1868, when he was called to fill the same chair at the newly founded university at Ithaca. In 1886 the university recognized his long period of faithful service by appointing him professor emeritus and relieving him from active duties. He retired to Syracuse, becoming dean of St. Andrew's Divinity School, and continued to reside in that city until his death, July 30, 1900.

As a scholar, the range of Dr. Wilson's interest covered the entire field of philosophy, theoretical and moral, as well as political economy, theology, and the history of science, philosophy, and the Church. During his professorship at Cornell he lectured regularly on psychology, logic, moral philosophy, the history of philosophy and the philosophy of history, and occasionally also on political economy and international law. Besides a large number of pamphlets on various subjects, he is the author of the following works: *The Church Identified by a Reference to the History of its Origin, Perpetuation, and Extension into the United States,* 1866; *Lectures on the Psychology of Thought and Action,* 1871; *Logic, Theoretical and Practical,* 1872; *Fancy and Philosophy, an Introduction to the Study of Metaphysics,* 1872; *First Principles of Political Economy,* 1875; *Live Questions in Psychology and Metaphysics,* 1877; *The Papal Supremacy and the Provincial System Tested by the Holy Scriptures and the Canon Law of the Ancient Church,* 1889; *Theories of Knowledge Historically Considered with Special Reference to Scepticism and Belief,* 1889.

The lectures by Dr. Wilson mentioned above constituted the entire philosophical curriculum offered at the university during the first eighteen years of its existence. In 1886 philosophical study at Cornell received additional impetus through the benevolence of Henry W. Sage, who gave the university $50,000 for the establishment, as a memorial to his wife, of a professorship of philosophy and ethics, and $10,000 for the erection of a residence for the occupant of the chair. On January 6, 1886, in nominating Dr. Jacob Gould Schurman as the first incumbent of the new professorship, he said: ‘‘ Before closing this report, I desire to put upon record for permanent remembrance this statement; that my chief object in founding this professorship is to secure to Cornell University for all coming time the services of a teacher who shall instruct students in mental philosophy and ethics from a definitely Christian standpoint, and while the title which I gave in my former communication comprehends in a general way just what I mean, I think it best to ask that the following more exact wording of it be the one adopted for actual use, viz., Susan E.

Linn Sage Professorship of Christian Ethics and Mental Philosophy."

Dr. Jacob Gould Schurman, the first Susan E. Linn Sage Professor of Christian Ethics and Mental Philosophy, is a descendant of a Dutch family, which, more than two hundred years ago, came to New York and settled near New Rochelle. Being Tory sympathizers in the Revolutionary War, the family left the States and settled in Prince Edward Island. Here Dr. Schurman was born at Freetown, May 22, 1854. He studied at Prince of Wales College, Charlottetown, from 1870 to 1872, holding one of the government scholarships. In 1873-74, he was a student at Acadia College, where he took first class honors in English and classics. In 1875 he received the Canadian Gilchrist Scholarship and became a student of the University of London, receiving the degree of Bachelor of Arts after two years' residence. He was then elected to a three-years' scholarship in philosophy, and also to the Hume Scholarship in Political Economy at University College, London, also tenable for three years. In 1878 he received the degree of Master of Arts at London, and somewhat later the degree of Doctor of Science from the University of Edinburgh. He was elected Hibbert Traveling Scholar for Great Britain and Ireland, and pursued his studies between 1878 and 1880 in the universities of Germany and Italy, notably at Heidelberg, Berlin, and Göttingen. In 1880 he became professor of English literature in Acadia College, and two years later professor of metaphysics and English literature at Dalhousie College. This latter position he retained until he came to Cornell in 1886. His works on philosophy are as follows: *Kantian Ethics and the Ethics of Evolution,* 1881; *The Ethical Import of Darwinism,* 1888; *Belief in God,* 1890; *Agnosticism and Religion,* 1896.

SAGE COLLEGE

During the next four years Dr. Schurman directed all the philosophical work of the university. An instructor was added to the department, the first incumbent (1886-87) being Alfred Sidney Johnson. He was succeeded the next year by Charles Augustus Strong, who, as Traveling Fellow of Harvard University, had spent the preceding year studying in Germany. He is now professor of philosophy at Columbia. In 1889 he was succeeded by James Edwin Creighton, who had studied under Professor Schurman at Dalhousie College, and had become Fellow of Cornell University in 1888. The courses offered during the four years 1886-90 show plainly the general divisions of the subject which at the present day are covered by several departments. An introductory course in physiology, psychology, and logic was required of all sophomores in arts, philosophy, science, and letters. With the assistance of an instructor, Dr. Schurman gave also courses in ethics, the history of philosophy and metaphysics, together with graduate courses on Kant's critical philosophy, the English empirical philosophy, and a philosophical seminary for the study of more advanced philosophical and psychological subjects.

In 1890 the study of philosophy at Cornell made another long stride, again through the beneficence of Henry W. Sage. At the meeting of the Board of Trustees, October 22, 1890, Mr. Sage announced his intention of increasing his former endowment by a further gift of $200,000, provided the trustees would agree to supplement this gift by regular appropriations from the general funds of the university. This condition was accepted, and the department received the name of the Susan Linn Sage School of Philosophy. Mr. Sage's purpose in founding the school, as well as his personal attitude toward philosophical studies, is best expressed in his own letter announcing the gift to the university.

"Heretofore Cornell has done little at her own proper cost to uplift the moral and religious element in her students. True, we have had this department of ethics several years; and we have had the chapel and its preachership eighteen years, but these have been carried on with very little expenditure from the funds of the university. We have done much, very much, for the foundations in science, in technical work, in agriculture, the classics and modern languages, in history and economic studies, in ornamentation of our campus, and noble buildings for all purposes; but for the top work of man's structure and development, the crown of his character and achievement, through his moral and religious nature—little, very little! Our function here is to educate man, and through education to provide foundation of character, based on moral principle, which shall underlie the whole man, and give impulse, tone, and color to all the work of his life. We cannot do that without facilities for cultivating and developing every side of his nature. Increase of knowledge addressed solely to the intellect does not produce full-rounded men; quite too often it makes stronger and more dangerous animals, living moral quality dormant, and the whole power of cultivated intellect the servant of man's selfish, animal nature. No education can be complete which does not carry forward, with the acquisition of knowledge for his intellectual side and physical wants, a broad and thorough cultivation of his moral and religious side, developing Christian virtues, veneration, benevolence, conscience, a sense of duty to God and man, purity and right living in the largest sense. In short, wise and broad education should and will ally man's intellect to his moral and religious, more completely than to his animal nature, and from that alliance results all the real dignity there is in mankind, making moral and intellectual qualities regnant, all others subject! I am so fully impressed with the vital importance of this subject, and the purpose of the proposed gift, that as trustee of Cornell University (with greater love for its policies and functions than I can express), I think you can afford to accept this gift with its attendant liabilities, and that you cannot afford to decline it. It is my free and voluntary offering for a purpose, the highest, the noblest, and the best ever promoted by this noble university.''

At the request of Mr. Sage, Professor Schurman spent the spring and summer of 1890 in visiting the universities of Great Britain and Germany for the purpose of studying the organization of various philosophical departments, and observing their methods of instruction. His report recommended the establishment of a psychological laboratory under the direction of a professor versed in physiology and neurology, and in the results of the new experimental psychology. He recommended further a more liberal provision for the traditional discipline of philosophy, logic, metaphysics, and ethics, and the establishment of a chair for the study of the history and philosophy of religion, the incumbent of which was to undertake also the work in Christian ethics which had been the nucleus of Mr. Sage's original plan for the department. Pedagogy, under the direction of Professor Samuel Gardner Williams, was included within the newly organized school of philosophy.

Of the school established according to these recommendations, Professor Schurman naturally became the dean, with the further title of professor of philosophy. The Rev. Charles Mellen Tyler became professor of the history and philosophy of religion, and of Christian ethics, a position which he continued to occupy until his retirement in 1903. The department of psychology was put in charge of Frank Angell, with the rank of assistant professor. The psychological laboratory was established in a few rooms on the fourth floor of White Hall. It soon outgrew these narrow quarters, however, and at the end of three years it was given its present location on the fourth floor of Morrill. The details of the development of the laboratory are presented later in the history of the department of psychology. James Edwin Creighton and William Caldwell became instructors in modern philosophy; the study of ancient philosophy was put in charge of William Alexander Hammond, with the rank of instructor; and Walter Francis Willcox was made instructor in logic.

A portion of the new endowment was directed toward the establishment of three fellowships with an annual cash value of $400 each, and six graduate scholarships of $200 each, their actual value being increased by remission of tuition to the holders. The first appointments to these fellowships were Ernest Albee, Ferdinand Courtney French, and Frank Thilly.

The original plan of the new school of philosophy included the establishment of a philosophical journal, and in January, 1892, the first number of the *Philosophical Review* appeared, under the editorship of Professor Schurman. It was then, as it continues to be, a bi-monthly periodical of about seven hundred pages per volume, devoted to the publication of articles on subjects falling within the field of philosophy and general psychology, and to the review of current philosophical literature. As an organ already existed for the publication of experimental and more technical studies in psychology (*The American Journal of Psychology*), it was decided to except this field from the

THE SAGE COLLEGE

sphere of the *Review*. The *Review* not only offers a ready means of publication for the products of both professors and students of the Sage School of Philosophy, but numbers among its contributors leading students of philosophy both in Europe and America. Its purpose and scope are well expressed in the following extracts from the editor's prefatory note to the first issue.

" It is fortunate, indeed, that the spirit of specialization has taken possession of philosophy, and we may congratulate ourselves on the special investigations and special publications conducted by Americans. But division of labor is profitless without co-operation. There exists, however, no journal which appeals to an audience composed of all those engaged or interested in philosophy. With the ever increasing specialization of studies, the need of such a common medium becomes every day more evident. To meet this need the *Philosophical Review* has been established. It will aim at the organization, the diffusion, and the increase of philosophical knowledge and activity in America. . . . The philosophical genius of the nation will, it is expected, find in the new periodical a medium of free expression, an aid to full and harmonious development, and an instrument for ministering to its needs. The scope of the *Review* will be as wide as philosophy, in its broadest sense. It will range over the field of psychology, logic, ethics, æsthetics, philosophy of education, philosophy of religion, metaphysics, philosophy of nature, and epistemology. . . . With the generality of its scope, the *Review* will combine an impartiality and catholicity of tone and spirit. It will not be an organ of any institution, or of any sect, or of any interest. Though receiving support from private endowments, so that its financial basis is sound and durable, it must be and remain, according to the terms of the subsidy, an absolutely free organ, national and international, of general philosophy. An equal hearing will be given to both sides of every unsettled question. Too much light cannot be thrown on obscure subjects, provided only it be ‘ dry ’ light. Writers alone will be responsible for their articles, which in all cases will be signed. The periodical itself will maintain the same objectivity of judgment as a journal of mathematics, or philology.”

During the second year of the school’s existence several changes occurred, and the process of growth continued rapidly. Professor Angell was called to Leland Stanford as professor of psychology, and Dr. Willcox became assistant professor of social science and statistics and political economy at Cornell. To fill Professor Angell’s place, Edward Bradford Titchener (Ph. D., Leipzig, 1892; A. M., Oxford, 1894), was made assistant professor of psychology. Dr. Creighton became associate professor of modern philosophy; Dr. Hammond, assistant professor of ancient and mediæval philosophy, and Dr. Thilly and Mr. Albee, instructors in philosophy.

With his election to the presidency of the university in 1892, Dr. Schurman’s duties were greatly increased. Nevertheless he maintained his active connection with the school until 1895, still acting as dean and professor of ethics, and nominally retaining the editorship of the *Philosophical Review.* Dr. Creighton, however, as associate editor, assumed the main editorial duties connected with its publication, which he has continued to discharge until the present time. From 1896 to 1898 Professor James Seth shared with Professor Creighton the editorial responsibilities, and since 1902, when President Schurman’s name was finally withdrawn, the name of Professor Ernest Albee has appeared as one of the editors. With the rapid growth of the university the duties and responsibilities of the office of president became constantly heavier, and President Schurman was reluctantly compelled to sever his connection with the school, and to appoint heads of departments, who in the future should be responsible for carrying on work in the various subjects embraced by the school. Drs. Creighton and Titchener became respectively professor of logic and metaphysics and professor of psychology. In 1896 Professor James Seth was called from Brown University to fill the chair of moral philosophy, President Schurman now withdrawing from the regular work of instruction which he had hitherto carried on.

In 1898 Professor Seth was called to the University of Edinburgh, and his chair was filled in 1899 by the appointment of Professor Evander Bradley McGilvary of the University of California. In 1898 Professor Samuel Gardner Williams retired from the professorship of pedagogy, and was succeeded by Dr. Charles De Garmo, who gave up the presidency of Swarthmore College to accept the position. About two years later it was deemed advisable to establish pedagogy as a separate department of the university, and this was accordingly done, Dr. De Garmo assuming the title of professor of the science and art of education. The various departments of the school have endeavored in every way to promote research, and to encourage publication on the part of their students. In this the close connection of the *Philosophical Review* has proved of great advantage. In addition to the Department of Summaries, which, in every number of the *Review*, is contributed almost entirely by the fellows and scholars in philosophy, a large number of original papers and reviews have been published from time to time in its pages. It should be mentioned, however, that the decision not to include experimental psychology in the field of the *Review* has prevented to some extent that department from sharing in the advantages of that connection, and has obliged the professor in charge to find other channels for the publication of the work of his department. This he has been successful in doing, and an account of the many important researches published in psychology is given below in the section devoted to that department. The *Review* is now (1904) publishing its thirteenth volume. Although closely connected with the department of philosophy at Cornell, the range of its publications has been representative of philosophical activity in America, and it has frequently received contributions from leading European scholars. The editors believe that it has contributed materially to the marked advance in philosophical scholarship during recent years, and to the great increase in interest as shown in the growth of departments of philosophy in our universities, and in the establishment of philosophical associations and journals devoted to philosophy and psychology.

It has never been the policy of the *Review* to publish in full the long papers that have been submitted as theses for the doctorate in philosophy. As many of these researches were seen to have permanent value, the professors of the various philosophical departments began in 1889 the publication of a series of " Cornell Studies in Philosophy." This series of monographs, of which five have already appeared, all bearing the imprint of the Macmillan Company, is to include the more important theses submitted for the degree of Doctor of Philosophy in the departments of logic and metaphysics, ethics, and ancient and mediæval philosophy.[1]

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[1] The monographs already published are: *Some Problems of Lotze's Theory of Knowledge*, by Edwin Proctor Robins. *Brahman: A Study of Indian Philosophy*, by Harvey Dewitt Griswold. *The Philosophy of Friedrich Nietzsche*, by Grace Neal Dolson. *The Ethical Aspects of Lotze's*

As will appear from what has already been said, the Sage School of Philosophy is the name given to the following group of departments: The History and Philosophy of Religion, Logic and Metaphysics, Psychology, Ancient and Mediæval Philosophy, and Ethics. A more detailed history of the work of these departments will be given in the sections which are to follow. Before closing this general account, however, it may be said that there has been a gradual development of courses in all departments since the foundation of the school. The work in all departments also falls into two fairly definite and distinct divisions. The object is, on the one hand, to provide a complete and systematic series of courses for undergraduate instruction, extending and modifying the courses from time to time as is demanded by the growth of the various sciences represented. On the other hand, the object of training philosophical scholars, and of promoting philosophical research, has been constantly borne in mind. Students who have pursued graduate studies in the school have entered various professions and have become teachers of subjects not directly related to philosophy or psychology. A large number, however, are to-day teaching in these or closely related departments. As it is through these former students that the school is most widely known, their names are here set down with the positions which they at present (1904) hold:

Albee, Ernest, Ph. D., 1894. Assistant Professor of Philosophy at Cornell University.

Bagley, William Chandler, Ph. D., 1900. Principal of Meramac School, St. Louis, Mo.

Baird, John W., Ph. D., 1902. Instructor in Psychology at Johns Hopkins.

Metaphysics, by Vida F. Moore. *Maine de Biran's Philosophy of Will*, by Nathan E. Truman.

Bentley, Isaac Madison, Ph. D., 1898. Assistant Professor of Psychology at Cornell University.

Blackman, William Fremont, Ph. D., 1893. Lecturer on Social Philosophy and Ethics at Yale University.

Bode, Boyd Henry, Ph. D., 1900. Instructor in Philosophy, the University of Wisconsin.

Brown, John Franklin, Ph. D., 1896. Assistant Professor of Education and Inspector of High Schools, State University of Iowa.

Cook, Charles Chauveau, B. L., 1890. Professor of English and Philosophy, Howard University.

Crawford, Alexander W., Ph. D., 1902. Dean and Professor of Philosophy, Beaver College, Beaver, Pa.

Dolson, Grace Neal, Ph. D., 1899. Professor of Philosophy, Wells College, Aurora, N. Y.

Elkin, William Baird, Ph. D., 1894. Acting Assistant Professor of Philosophy, the University of Missouri.

Findlay, John, A. M. (Queen's University) 1888. Professor of Philosophy, the University of Southern California.

French, Ferdinand Courtney, Ph. D., 1892. Professor of Philosophy, the University of Nebraska.

Gamble, Eleanor A. McC., Ph. D., 1898. Associate Professor of Psychology, Wellesley College.

Griswold, Harvey Dewitt, Ph. D., 1900. Professor of Philosophy, Forman Christian College.

Hannum, Louise, Ph. D., 1894. Preceptress and Professor of English Literature, Colorado State Normal College.

Hill, Albert Ross, Ph. D., 1895. Dean of the College of Education, the University of Missouri.

Hinman, Edgar Lenderson, Ph. D., 1895. Adjunct Professor of Philosophy, the University of Nebraska.

Hugh, David Douglas, A. M., 1893. Professor of Psychology and Pedagogy, Colorado State Normal School.

Irons, David, Ph. D., 1894. Associate Professor of Philosophy, Bryn Mawr College.

de Laguna, Theodore de Leo, Ph. D., 1901. Assistant in Philosophy, Cornell University.

Lane, Wilmot Burkemar, Ph. D. (University of Wisconsin). Professor of Philosophy and Psychology, Randolph-Macon Woman's College.

Lefevre, Albert, Ph. D., 1898. Professor of Philosophy, Tulane University.

Leighton, Joseph Alexander, Ph. D., 1894. Chaplain of the College, and Professor of Philosophy, Hobart College.

Lingle, Thomas Wilson, Ph. D., 1898 (Leipzig). Professor of History and Philosophy, Mackenzie College.

Macdonald, Murdock Steward, Ph. D., 1904. Professor of Philosophy, the University of New Brunswick.

Major, David Ross, Ph. D., 1896. Assistant Professor of Education, Ohio State University.

Manahan, William, Ph. D., 1898. Instructor in Philosophy, Manitoba College.

Meiklejohn, Alexander, Ph. D., 1897. Assistant Professor of Philosophy, and Dean of the University Faculty, Brown University.

Moore, Vida Frank, Ph. D., 1900. Professor of Philosophy, Elmira College.

Muir, Ethel, Ph. D., 1896. Teacher of Philosophy and Sociology, Briar Cliff Manor School.

Pillsbury, Walter Bowers, Ph. D., 1896. Assistant Professor of Psychology, the University of Michigan.

Read, Melbourne Stuart, Ph. D., 1895. Professor of Philosophy, Colgate University.

Squire, Carrie Ranson, Ph. D., 1901. Instructor in the State Normal College of Alabama.

Talbot, Ellen Bliss, Ph. D., 1898. Professor of Philosophy, Mt. Holyoke College.

Thilly, Frank, Ph. D., 1891 (Heidelberg). Professor of Philosophy, Princeton University.

Tower, Carl Vernon, Ph. D., 1898. Professor of Philosophy, the University of Vermont.

Truman, Nathan E., Ph. D., 1903. Professor of Greek and Philosophy, the University of South Dakota.

Washburn, Margaret Floy, Ph. D., 1894. Associate Professor of Psychology, Vassar College.

Whipple, Guy Montrose, Ph. D., 1900. Assistant Professor of the Science and Art of Education, Cornell University.

Whitney, George W. T., Ph. D., 1903. Associate in Philosophy, Bryn Mawr College.

Wright, Henry W., Ph. D., 1904. Instructor in Philosophy, Cornell University.

Psychology

It is always difficult to assign an exact date to the appearance of a new branch of scientific enquiry. We may say roughly that the experimental sciences are products of the nineteenth century; we hardly dare say that experimental physics or experimental physiology came upon the scene in this or that particular year. For an experimental science is the consummation of tendencies of thought that are both widespread and deep-seated in the human mind; it is rather a coming-of-age than a new birth; revolutionary as it may seem to those who bear their part in its explicit formulation, its germinal ideas can be traced by many channels, far back into the intellectual history of mankind. We may declare, with some show of truth, that modern psychology began with Herbert (1776-1841) or with Fechner (1801-1887); we may date its advent, still more definitely, from the publication in 1860 of Fechner's *Elements of Psychophysics:* but if we do these things, we are always liable to the reminder that Aristotle performed psychological experiments some three and a half centuries before Christ. Doubtless, psychology at large took on its scientific shape about the middle of the nineteenth century. But the very fact that Fechner was able to write a system of psychophysics, *totus, teres atque rotundus,*—to fill two octavo volumes with a systematic presentation of observations and ideas,—this fact, while it does not detract from his originality, proves clearly enough that he had predecessors.

If, however, we cannot without qualification take the year 1860 as the year of birth of modern psychology, we can at any rate define the time at which modern psychology became an academic subject. Modern psychology is, essentially, an experimental psychology, a psychology which has done forever with casual observation and haphazard introspection, and which works as strictly, as planfully, under a control as rigid and exacting, as do the experimental sciences of matter and of life. Now it was in 1879 that Wundt (b. 1832) established at the University of Leipzig the first psychological laboratory that the world had known. This year, then, it need hardly be said, marks an epoch in the history of psychology. But, locally regarded, it marks an epoch also in the teaching of psychology at a certain university center. And what holds of Leipzig, holds in this regard of all other universities at which psychology has been taught. The history of the subject falls into two sharply separated periods,—the period which precedes and the period which follows the establishment of a psychological laboratory.

The psychological laboratory of Cornell University was founded with the foundation of the Sage School of Philosophy in 1891,—twelve years after Wundt had opened his laboratory at Leipzig, and eight years after Professor G. S. Hall (now president of Clark University) had opened the first American laboratory at the Johns Hopkins University. Up to this year, the history of psychology at Cornell consisted simply in the record of lecture courses,—courses that gradually increased in scope and depth as the science of psychology was advanced, but that nevertheless did not indicate any active participation in its progress on the part of faculty or students. Psychology appeared as a three-hour course in the first third of the junior year, in the original Catalogue and Register of 1868-69.[1] In 1880-81 it is described by Professor W. D. Wilson[2] as " comprising a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge."[3] In 1885-86 its title was the " science of psychology."[4]

In 1886 Professor Wilson became emeritus professor of moral and intellectual philosophy, and Professor (now President) J. G. Schurman was called to the newly established Sage chair of Christian ethics and mental philosophy. Elementary psychology—preceded by a physiological introduction—now occupied the second third of the sophomore year. The lectures of this course, and of an optional course in advanced psychology, were given by Mr. A. S. Johnson. The last third of the sophomore year was devoted to logic.[1] This triple course, offered to undergraduates in their second year of academic work, has survived the changes consequent upon the foundation of the Sage School of Philosophy and the introduction of the elective system, although the physiological lectures no longer form an integral part of it. It consists, at the present time, of a series of lectures on psychology, logic, and ethics, given respectively by Professors Titchener, Creighton, and McGilvary.

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[1] Catalogue, 43; Register, 50.—The course was continued as a three-hour course until the end of the academic year 1875–76. In the Register of 1876–77, it appears as a three-hour course for students in Arts, and a two-hour course for other undergraduates. In 1878–79 it became a two-hour course for all students: Register, 90.

[2] For notice of Professor Wilson, see above, pp. 66 ff.

[3] Register, 75.

[4] Register, 56.

In 1887-88 Mr. Johnson's place was taken by Mr. C. A. Strong, now professor of psychology at Columbia University. No advanced course was offered in psychology.[2] In 1888 Professor Schurman gave the sophomore lectures in psychology, and Mr. Strong offered, in the first term of the junior year, a course in physiological psychology.[3] In the following year Professor Schurman and Mr. J. E. Creighton (now professor of logic and metaphysics in Cornell University) gave the sophomore course in logic and psychology; there was no other psychological work.[4] In 1890-91 Professor Schurman offered, in the junior or senior year, a course in advanced logic and psychology (two hours throughout the year), the psychological portion of which was based upon Ladd's recently published *Elements of Physiological Psychology* and Lotze's *Metaphysics*.[5]

So things stood at the end of the academic year 1890-91. We notice that from the first, psychology has found representation at Cornell University; and that from the first, it has been empirical in character. The connection of mind with body, of psychology with physiology, was emphasized in the first catalogue of 1868-69. We notice also that the courses have from time to time been amplified and extended in order to keep pace with the development of psychological science. But we see as well that psychology has been regarded throughout as a sub-department of philosophy, as a handmaid in the service of the supreme discipline of metaphysics: that there has been no desire to exploit it as an end-in-itself, for its own sake, as a separate and independent source of scientific knowledge. This attitude has gradually but surely been changed, as a result of the organization of the Sage School.

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[1] Register, 1886-87, 10, 22, 25, 68 f.

[2] Register, 25, 90 f.

[3] Register, 94.

[4] Register, 96.

[5] Register, 97 f.

The history of this organization has been told elsewhere.[1] We have here to note that in 1891 Mr. F. Angell, B. S., University of Vermont, Ph. D., Leipzig University,—now professor of psychology at the Stanford University,—was called as assistant professor of psychology to take charge of the newly established laboratory of experimental psychology. The sophomore lectures on psychology were still given by Professor Schurman.[2] Professor Angell offered further a three-hour course in general psychology (lectures, recitations, and experimental illustrations),—a course which, under the title of Systematic Psychology, has with some modification persisted to the present time; and a Psychological Seminary for the direction of laboratory work and original research in experimental psychology,—a course in which, for the first time in its history, the university proposed to take an active part in the advancement of modern psychology.[3] Unfortunately Professor Angell's health broke down soon after the opening of the laboratory in the second half of the year, so that his programme of work could not be carried out with anything like completeness; and he was himself compelled in 1892 to resign his professorship and take up new work in a milder climate.

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[1] See above, pp. 66 ff.

[2] Register, 98 f. The instructors in charge of recitations were Mr. J. E. Creighton, Mr. W. F. Willcox, now dean of the College of Arts and Sciences and professor of political economy and statistics in Cornell University, and Mr. W. Caldwell, now professor of philosophy in the McGill University, Montreal, Canada.

[3] Register, 99 f.

In 1892 the laboratory was put in charge of Mr. E. B. Titchener, who, like Mr. Angell, was a graduate of the Leipzig University,[1] and who was similarly called to Cornell as assistant professor of psychology.[2] At this period the laboratory consisted of a set of four rooms, made by division into six, occupying the southern end of the upper floor of White Hall: rooms that have since been held in turn by the Medical College, and by the department of education. Photographs of the four main rooms (optics, acoustics, chronometry, and director's office) are still in the possession of the psychological department. In 1895 the laboratory, which had far outgrown its quarters, moved to its present situation in Morrill Hall, occupying a suite of eleven rooms on the upper floor of the building. Of these rooms, two (a dark and a light room) are devoted to optics, and one each to acoustics, haptics, taste and smell, the affective processes, and chronometry; there are besides a lecture room, a workroom, and two offices, one of which is also used as a seminary room. A description of the laboratory and of its equipment for technical readers will be found in two articles by the present writer: "A Psychological Laboratory," *Mind,* N. S., July, 1898, vii., 311; and "The Equipment of a Psychological Laboratory," *American Journal of Psychology,* January, 1900, xi., 251. The objects and uses of the laboratory will be discussed later.

The staff of instruction consisted at first, as we have seen, of a single assistant professor. In 1895, the year of the laboratory's removal to Morrill Hall, Mr. Titch-

[1] M. A., Oxon., Ph. D., Leipzig ; LL. D., Wisconsin.

[2] Register, 20.

ener was appointed Sage Professor of Psychology, and Mr. W. B. Pillsbury[1] was made lecturer in psychology. In 1897 Mr. Pillsbury's place was taken as assistant in psychology by Mr. I. M. Bentley.[2] In the following year Mr. Bentley was promoted to an instructorship, and Mr. G. M. Whipple[3] became assistant. In 1899-1900 a second assistant was added to the department in the person of Mr. W. C. Bagley.[4] In 1901 Miss M. F. Washburn,[5] warden of Sage College, was appointed lecturer in psychology. In 1902 Mr. Bentley was again promoted to an assistant professorship of psychology, and Mr. J. W. Baird[6] succeeded Mr. Whipple in the assistantship. In 1903 the assistants were Mr. H. C. Stevens[7] and Mr. C. E. Ferree.[8] At present, therefore, the instructing staff consists of a professor, an assistant professor, and two assistants. It must be added that in 1901 the university placed at the disposal of the department the services of a skilled mechanician, Mr. F. A. Stevens, whose workshop in Sibley College—furnished in part by the psychological laboratory, and in part by the director of Sibley College—practically adds a twelfth room to the laboratory, and whose labors in the construction of new apparatus have constituted a great gain as well as a great saving to the department.

As the department of psychology has grown in the number of its instructing staff, so has it grown in the scope and variety of the instruction offered to the student. It would be tedious to trace the gradual development of the psychological curriculum through all its stages. Of late years it has taken final form as follows:

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[1] A. B., University of Nebraska; Ph. D., Cornell; now assistant professor of psychology in the University of Michigan.

[2] B. S., University of Nebraska; Ph. D., Cornell.

[3] A. B., Brown University; Ph. D., Cornell; now assistant professor of the science and art of education in Cornell University.

[4] M. S., University of Wisconsin; Ph. D., Cornell; now professor of psychology and education in the State Normal College, Dillon, Mont.

[5] A. B., Vassar College; A. M., Columbia University; Ph. D., Cornell; now assistant professor of psychology in Vassar College.

[6] A. B., University of Toronto; Ph. D., Cornell; now of the department of psychology, Johns Hopkins University.

[7] A. B., University of Wisconsin.

[8] A. M., M. S., Ohio Wesleyan University, Delaware, Ohio.

The academic student is introduced to the study of philosophy in his sophomore year, by way of the triple course mentioned above. Lectures on psychology, with numerous demonstrations, are given by Professor Titchener in the first third of the year; these are followed by a brief course in logic, given by Professor Creighton, and a similar course in ethics, given by Professor McGilvary. In the junior year, two full courses in psychology are offered: a laboratory drill-course, occupying three afternoons a week throughout the year, and a three-hour lecture course running parallel to it. In the senior year, the course in systematic psychology, referred to above, may be taken (three hours throughout the year), or the course may be postponed until the first degree has been received. Laboratory work is continuous throughout this year; and in the second semester there is offered, further, a one-hour reading course in French, German, or Italian psychological literature. The three graduate years are given over to research work in the laboratory, and to attendance on special advanced courses (experimental æsthetics, the history of psychophysics, the history of psychology, mental pathology, etc.) given by Professor Titchener, or Assistant Professor Bentley. The complete course in psychology thus covers a period of six years,—three undergraduate, and three graduate.

The development of the laboratory has, of necessity, gone hand in hand with the development of the plan of instruction. In other words, the laboratory is not one single laboratory, but three: a demonstrational laboratory, a drill laboratory, and a research laboratory.

Many of the demonstrational appliances employed in the sophomore course have been devised at Cornell and built by Mr. F. A. Stevens: some of them have been described by the writer in the *American Journal of Psychology,* July-October, 1903, xiv., 439, and January, 1904, xv., 57. The junior drill-course and the instruments required for it may be said to be the creation of the Cornell department. The apparatus was designed in the laboratory, and has been put on the general market by the C. H. Stoelting Scientific Instrument Company of Chicago, Ill. Their provision makes it possible for the first time in the history of psychology to purchase outright a working outfit for a newly established laboratory; and they, together with the accompanying text-book,—of which more presently,—have done much to settle the position of experimental psychology as an academic subject in American curricula. Finally, the laboratory has been carefully furnished with a view to original investigation in all branches of the science. The wide range of its activity in this respect may best be indicated by a list of the doctorate theses published by the department. These are as follows:

1895: M. F. Washburn, *Ueber den Einfluss der Gesichtsassociationen auf die Raumwahrnehmungen der Haut.*
1896: A. J. Hamlin,[1] *Attention and Distraction.*
1897: W. B. Pillsbury, *The Reading of Words; a Study in Apperception.*
1897: D. Irons,[2] *The Nature of Emotion.*
1898: E. A. McC. Gamble,[3] *The Applicability of Weber's Law to Smell.*

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[1] Sometime assistant in psychology at the University of Nebraska; now Mrs. E. L. Hinman.

[2] Now professor of philosophy in Bryn Mawr College.

[3] Now instructor in psychology at Wellesley College.

1899: S. E. Sharp, *Individual Psychology.*
1899: I. M. Bentley, *The Memory Image and its Qualitative Fidelity.*
1900: W. C. Bagley, *The Apperception of the Spoken Sentence; a Study in the Psychology of Language.*
1901: C. R. Squire,[1] *A Genetic Study of Rhythm.*
1901: G. M. Whipple, *An Analytic Study of the Memory Image and the Process of Judgment in the Discrimination of Clangs and Tones.*
1902: F. A. Winger,[2] *An Investigation of Fechner's Colors.*
1903: J. W. Baird, *The Influence of Accommodation and Convergence upon the Perception of Depth.*

Three other theses, dealing respectively with Fluctuation of Attention, with the value of the Expressive Method in the study of Affection and Attention, and with the experimental investigation of the Affective Processes, are at the present writing almost completed. Besides these major studies, some fifty minor studies have been published from the laboratory since the year 1892. And these sixty-odd publications do not include books and articles written by the head of the department.

It is surely needless to insist that the discharge of these three laboratory functions, and the handling of over two hundred students annually, are not easy matters in the cramped space afforded by eleven attic rooms,—several of them gained by the subdivision of single rooms. The psychological department is, indeed, as overcrowded in 1904 as it was in White Hall in 1895. The shift of the demonstrational laboratory to Goldwin Smith Hall will afford some little relief; and it may, perhaps, be anticipated that the laboratory will, upon the completion of this new hall, be afforded additional space in Morrill Hall. What is needed, however, for the adequate extension of the department, is a separate building in which room could be found, not only for the analytical study of the adult human mind, but also for comparative investigation of the mental processes of various forms of animal life. This latter branch of experimental psychology, which has been pursued with marked success especially at Clark and Columbia Universities, is out of the question at Cornell so long as the department is confined to a set of rooms within a building employed for general university purposes.

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[1] Now assistant professor of psychology and education in the State Normal College, Dillon, Mont.

[2] Now Mrs. W. C. Bagley.

A word must now be said upon the psychological works published by Professor Titchener. In 1896 appeared *An Outline of Psychology,*—a book intended primarily to serve as basis for the lectures of the sophomore course. The work was so far polemical in character that it was meant to lay stress upon the adequacy of the experimental method to the analysis of the various mental formations, and to show the priority of structural to functional analysis: this in contrast to the prevailing tendencies of psychological text-books. It is indicative of the rapid advance in psychological thought and teaching, that the positions which in 1896 were somewhat daring, or at least distinctly controversial, strike one to-day as little more than commonplaces. In 1898 appeared a second elementary work, *A Primer of Psychology,* a systematic outline intended for use in normal schools and in the smaller colleges. This book has had a marked success in England, and has been translated into Spanish, as has the *Outline* into Russian and Italian. Finally, in 1901, appeared a two-volume work entitled *Experimental Psychology: Qualitative,* an account of typical experiments selected by the author from a wide range of material for the drill-course of the junior year. This book is now being translated into Italian. The two concluding volumes (Quantitative Experiments) are in preparation, and will be published in 1905. Professor Titchener has further been an associate editor since 1895 of *The American Journal of Psychology,* and since 1894 American editor of *Mind: A Quarterly Review of Psychology and Philosophy.* He is the author of many articles, experimental and systematic, in the leading psychological magazines of England, Germany, and the United States.

Looking back over this review of twelve years of laboratory activity, we see that the department of psychology has steadily increased, whether in the number of students enrolled, or in the number and variety of its courses of instruction; and that this steady growth has been recognized in various ways—in the appointment of a second permanent officer, in the assignment of a mechanician—by the university authorities: so that at the present time experimental psychology stands on a fair and equal footing with the other and older departments recognized by the university as integral parts of the academic system. Only in the matter of space accommodations has the department fared badly; and after all, a science which comes as late as did psychology to the feast of the experimental disciplines must be content with the crumbs that fall from the benefactors' table. As regards its contributions to the advance of psychology, the Cornell department may well be proud of its teaching record,—a record which perhaps no other American university has equaled; while in original productivity it is at least the peer of the other larger departments throughout the country.

The Department of Ethics

When in 1895 the philosophical subjects which President Schurman had taught were assigned to various heads of departments, he himself still kept control of the work in ethics for one year more, but in 1896 Professor Seth[1] was called from Brown University as professor of moral philosophy. Professor Seth, however, remained only two years, going in 1898 to the University of Edinburgh. President Schurman now resumed for one year the work of instruction in this subject, assisted by Dr. Albert Lefevre as lecturer.

The following year Professor McGilvary[2] was called to this chair from the University of California. In 1904 the title of the chair was changed, and Professor McGilvary became professor of ethics, in recognition of the fact that the work of the department included instruction not only in ethical theory, but also in the history of moral practice. The courses in the department now fall into three groups: (1) Elementary instruction in systematic ethics; (2) Lectures in the history of moral customs and moral ideals; (3) Advanced work for graduates in the history of ethical systems and in ethical theory.

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[1] James Seth was born in Edinburgh in 1860. He received his education at the University of Edinburgh and at Leipzig, Jena, and Berlin. From 1886 to 1892 he was professor of philosophy at Dalhousie College, and from 1892 until 1896 at Brown University. He remained at Cornell for two years, conducting the work of the department of ethics with great success. At the end of that time he was honored by receiving the appointment to the historic chair of moral philosophy at the University of Edinburgh. He still remains co-operating editor of the *Philosophical Review*, and its editorial representative in Great Britain. Professor Seth is well known as a contributor to many philosophical periodicals, and is the author of *A Study of Ethical Principles* (1894).

[2] Evander Bradley McGilvary was born in Bangkok, Siam, in 1864. He received his earlier education in North Carolina, where he was graduated valedictorian of his class from Davidson College, in 1884. After teaching two years he went to Princeton to study theology. While there he attended lectures in philosophy under President McCosh, receiving the degree of A. M. in 1888. In 1891 he went to Siam, where for three years he was engaged in literary work under the Presbyterian Board of Foreign Missions. From 1894 to 1897 he was instructor in the University of California, at the same time being enrolled as graduate student for the doctor's degree, which he received *magna cum laude*, 1897. He was then promoted to be assistant professor of logic and the theory of knowledge. He has published several translations in the Lao dialect of the Siamese language, has written various articles for *Mind* and the *Philosophical Review*, and was a philosophical contributor to the *New International Encyclopædia.*

History and Philosophy of Religion and of Christian Ethics

In the report of Professor Schurman upon the organization of the Sage School of Philosophy, he recommended the appointment of an assistant professor whose work should be devoted to the history and philosophy of religion. This chair was afterward raised to the rank of a professorship, and the Rev. Charles Mellen Tyler, M. A., was appointed to it.

Professor Tyler was educated at Phillips Academy, Andover, and at Yale College, where he graduated in the year 1855. After a year of study in the Union Theological Seminary (1855-56), he was ordained to the ministry of the Congregational Church. He held pastorates in Galesburg, Ill., Natick, Mass., Chicago, Ill., and in Ithaca, New York. He served as chaplain of the Twenty-Second Massachusetts Regiment, from December, 1863, to July, 1864, and was present at many of the severest battles of the Wilderness.

Possessing a fondness for literature and history, with a style of unusual beauty and grace, and enjoying the personal friendship of the founder of the Sage School, it was natural that his name should be considered with reference to this chair. In order that the subjects embraced in it might correspond to the previous studies of Professor Tyler, the subject of Christian ethics was added. Professor Tyler's lectures have embraced courses in applied ethics, with a discussion of the practical value of the ethical ideas furnished by sociology, utilitarianism, æstheticism, optimism, and culture; also, upon the bearings of moral standards upon social relations, riches and poverty, public opinion, university life, the theater, the press, incivism, and kindred topics; also, upon the history of religion, in which primitive religion and the comparative history of religion were discussed. In these lectures, the origin of religious ideas, cults, and rights of the Semitic peoples were discussed. A subsequent course treated of the present religions of the Orient, Egypt, Greece, and Rome. In a course for advanced students, Professor Tyler treated of the philosophy of religion, including the grounds of religious belief, metaphysical, ethical, æsthetical, and spiritual. Agnosticism, pantheism, and theism were compared. A seminary for the study of the history and philosophy of religion constituted a part of this work.

Professor Tyler published a volume entitled *Bases of Religious Belief.*

He received the degree of Doctor of Divinity from Yale University.

In June, 1903, he became professor emeritus and lecturer on the history and philosophy of religion and of Christian ethics.

Department of Logic and Metaphysics

This department has been in charge of Professor J. E. Creighton[1] since its organization in 1895. Pro-

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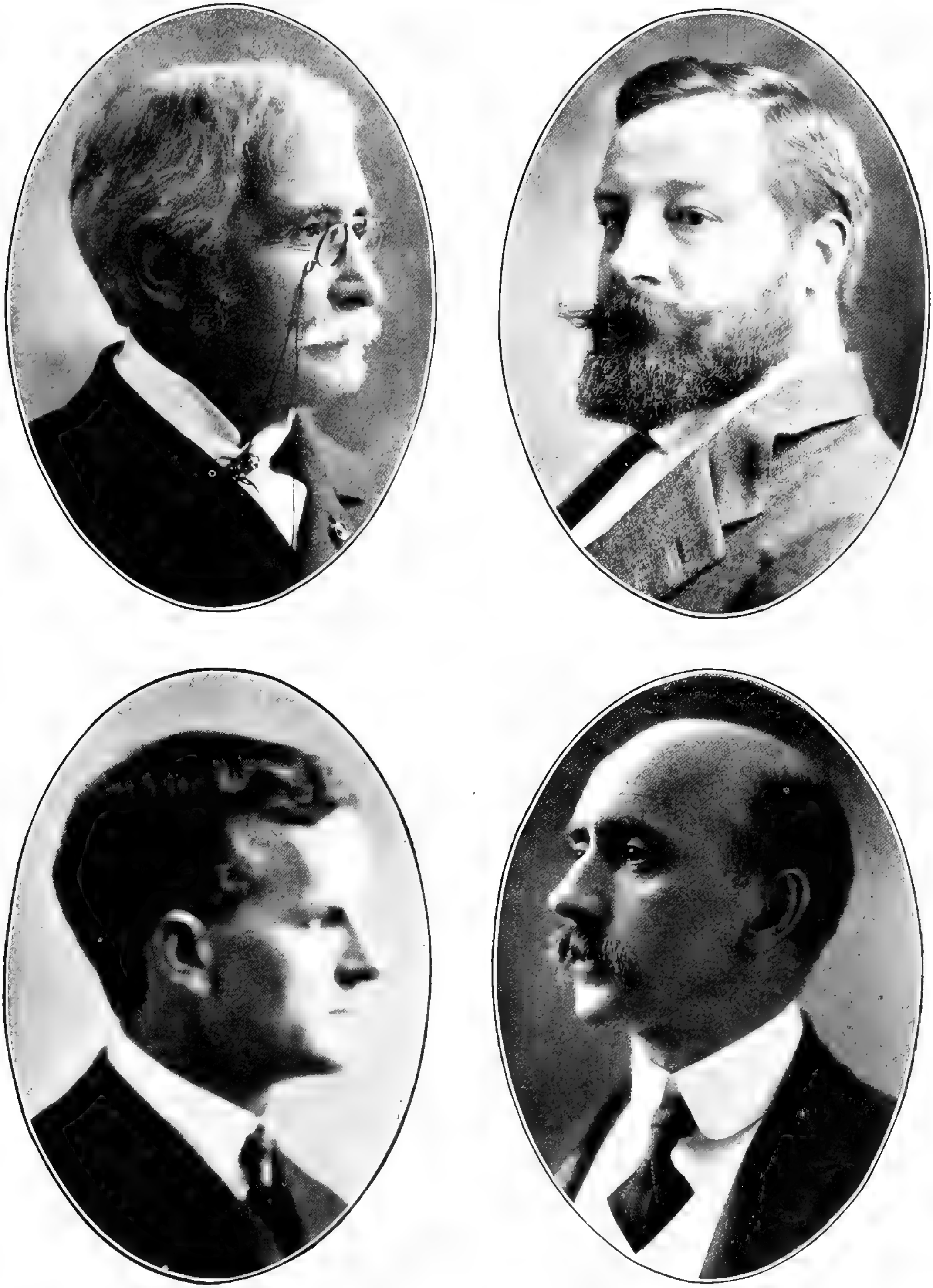
[1] James Edwin Creighton was born in Pictou, Nova Scotia, and after teaching for some years in the public schools, graduated from Dalhousie College in 1887. As a student, his interest in philosophy had been aroused by Dr. Schurman's teaching, and continuing his studies he came to Cornell as fellow in 1888. From 1889 to 1892 he was instructor in philosophy, spending during this period several months on two occasions in Germany as a student at the Universities of Leipzig and Berlin. In 1892 he received the degree of Doctor of Philosophy, *summa cum laude*, from Cornell University and was at once appointed assistant professor. In 1895 he was made



SAGE SCHOOL OF PHILOSOPHY

Charles Mellen Tyler
Ernest Albee

Edward Bradford Titchener
William Alexander Hammond

fessor Ernest Albee[1] has also been connected with the department since its first inauguration, although the historical courses which he gives also fall partly within the field of ethics.

From 1893 to 1897 Mr. F. C. S. Schiller[2] was also an instructor in the department. In 1896 Dr. David Irons was appointed lecturer and in 1897 instructor, holding this position until 1900, when he was appointed associate professor of philosophy at Bryn Mawr College. He was succeeded by Dr. Albert Lefevre, who was made assistant professor in 1902, and in 1903 was called as professor of philosophy to Tulane University. The vacancy thus created was filled by the appointment of Henry W. Wright, a graduate of Cornell, who had pursued graduate studies in the school for three years.

professor of logic and metaphysics. Professor Creighton has borne the main editorial duties of the *Philosophical Review* since its establishment. He is the American editor of *Kantstudien.* To both of the journals he has been a frequent contributor and is the author of an Introductory Logic and has co-operated in the translation of Wundt's *Human and Animal Psychology* (1894) and of Paulsen's *Immanuel Kant: His Life and Doctrine* (1901). In 1903 he received the degree of LL. D. from Queen's University.

[1] Ernest Albee was graduated from the University of Vermont in 1887. After teaching for two years he was a graduate scholar and fellow at Clark University, 1889–1891. The following year he was appointed fellow in philosophy at Cornell University, and in 1892 was appointed instructor. In 1894 he received the degree of Doctor of Philosophy and was appointed assistant professor of philosophy in 1902. Professor Albee has contributed frequently to the *Philosophical Review*, of which he is an editor. He is also the author of a very able and scholarly work entitled *A History of English Utilitarianism* (1902).

[2] Ferdinand Canning Scott Schiller, M. A., of the University of Oxford, was appointed an instructor in philosophy in 1893 and served until 1897, when he was appointed fellow and tutor in philosophy in Corpus Christi College and lecturer on philosophy in the University of Oxford. During his residence here Mr. Schiller gave courses in psychology, German philosophy, ethics, and logic.

Mr. Schiller published anonymously a volume entitled *Riddles of the Sphinx* (1891), which attracted marked attention and has since passed to a second edition; *Axioms as Postulates in Personal Idealism* (1902); *Humanism* (1903). He is one of the editors of *Mind*, and a frequent contributor to philosophical reviews.

In this department the undergraduate courses consist of elementary logic (which is usually taken by students in the sophomore year), the history of philosophy (a junior course covering the whole field of the history of philosophy), and metaphysics (systematic discussions of fundamental philosophical problems, designed for those who have completed the two previous courses). As supplementary to these three main courses, shorter courses on the history and philosophical significance of evolution, and on the relations of philosophy to literature during the nineteenth century, are offered.

Undergraduates who have sufficient training have also the privilege of electing some of the special courses that are intended mainly for graduates, although as a rule it is deemed undesirable to encourage specialization in this department to a great extent during undergraduate years.

In the graduate work it is sought to provide instruction in three lines of work: (1) In advanced logic, and the logical methods of the sciences; (2) In the great historical systems of philosophy, both English and German; (3) in metaphysical speculation as seen in the light of contemporary criticism and discussion. It has always been the policy of this department to emphasize the thorough study of historical systems as a necessary preliminary to understanding the problems of the present time. To this end special courses are offered in English empiricism, and Continental rationalism of the seventeenth and eighteenth centuries, in Kant's philosophy, in the post-Kantian systems, especially in the philosophy of Hegel, and in the pessimism of Schopenhauer and von Hartmann. In connection with the study of German philosophy, it has been found necessary to provide instruction in reading German philosophy in order to familiarize the students with philosophical terminology, and to give them accuracy and fluency.

Department of Ancient and Mediæval Philosophy and Æsthetics

It was part of the original plan of the organizer of the Sage School to have special instruction given in the early history of philosophical ideas. In 1891, Dr. W. A. Hammond[1] was appointed instructor in ancient and mediæval philosophy, and in 1892 was made assistant professor. General courses have been given every year in the history of the Greek systems, and in the leading representations of scholasticism. From the foundation of the school, special instruction has also been given in Greek texts, especially in the dialogues of Plato and the Nicomachean ethics of Aristotle.

Since 1900 a course of instruction has been given in the philosophical and humanistic movements of the Renaissance. In 1902-03 a course of lectures was delivered on æsthetic theories and the philosophy of art, and in 1903 the subject of æsthetics was officially added to the department of ancient and mediæval philosophy. Professor Hammond also gives a course in the reading of philosophical German.

Science and Art of Education

In President White's final report presented to the trustees on June 17, 1885, the question of establishing a department of instruction for teachers was presented, and it was proposed that a lecturer on methods of instruction be appointed in order that graduates of this university who proposed to pursue the profession of teaching should be equipped by the study of the history of education and of the theories of the greatest educators as well as by the study of philosophical methods of instruction. It was thought in this way that students who had received a university training would likewise have it in their power to obtain the special specific training which was afforded in normal colleges. Teaching above all must be taught by example, and thorough scientific training is the best preparation to qualify for imparting instruction.

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[1] William Alexander Hammond was born in New Athens, Ohio. From 1880 to 1883 he studied philosophy under President James McCosh at Princeton, and in 1885 was graduated from Harvard University. From 1885 to 1888 he was lecturer in classics at Kings College, Windsor, Nova Scotia. In 1891, after three years' residence in Germany, he received the degree of Doctor of Philosophy from the University of Leipzig. In 1902 he published a translation of Aristotle's *Psychology*, with commentary, and in the same year, with the co-operation of Professor C. E. Bennett, a translation of the *Characters of Theophrastus, with an Introduction.*

President Adams in his inaugural elaborated the suggestion which his predecessor had made and urged the appointment of a professor of the science and art of teaching, as a means of making more intimate the relations between the university and the school system of the state.

This department, which was established in 1886, was first placed in charge of Dr. Samuel Gardner Williams, then a Cornell professor of geology. At that time departments of education were comparatively rare in American universities, Michigan having made the first serious attempt to give professional preparation to secondary teachers, and to the leaders of elementary education, only seven years before.

Dr. Williams was by temperament and experience well qualified to take up the new work. He was educated at Hamilton College, from which he graduated in 1852, and from which he received an honorary doctor's degree in 1871. His first experience in teaching appears to have been as principal of the Groton Academy. Then for seven years he served as principal of the Ithaca High School, after which he was elected to the responsible position of head of one of the high schools of Cleveland, Ohio. In 1879 he was appointed professor of geology at Cornell University.

By the time of Dr. Williams' transfer to the department of education, it had become fairly evident that the professional preparation of teachers for secondary schools should no longer be neglected. The older countries of Europe were making serious efforts to meet the new need, while American conditions were rapidly changing. Many new studies were claiming attention, new kinds of professional education were being established, in which work Cornell University had a large share, and, most important of all, many new classes of the community were demanding secondary and higher training fitted to their several needs. These new complex conditions on every side called for more expert skill, not only in teaching the various studies and estimating their varying values, but in the wise expenditure of public revenues, and in the efficient superintendence of great numbers of inadequately prepared teachers.

This new work was happily inaugurated at Cornell by Dr. Williams, under the general heads of theory, history, and practice of education. Courses in these subjects under varying titles were continued until he became professor emeritus in 1898. Two years later Dr. Williams died at the age of seventy-two. His hearty, genial personality, loved by many, and his other sterling qualities, made his death deeply lamented by his colleagues and friends. Dr. Williams was a prolific writer on geology, and produced three important books on the history of *Ancient, Mediæval,* and *Modern Education* respectively.

Dr. Williams was succeeded in the department in the autumn of 1898 by Professor Charles De Garmo, then president of Swarthmore College. Dr. De Garmo took his degree at the University of Halle in 1886. His teaching experience was mostly in the Illinois State Normal University, eleven years; the University of Illinois, one year; and in Swarthmore College, seven years. He also served for three years at the beginning of his teaching as superintendent of a system of town schools in Illinois.

Dr. De Garmo has taken an active part in the educational associations of the country, and has published a number of books on education, among which the following may be mentioned: Translation of Linder's *Psychology, The Essentials of Method, Herbart and the Herbartians, Annotations to Herbart's Outlines of Educational Doctrine, Interest and Education.*

The courses established by Dr. Williams have, under somewhat different titles, been expanded and enriched, as growing experience has revealed what is most worth doing.

In 1901 the work in the science and art of education was dissociated from the Sage School of Philosophy with which it had been somewhat lightly connected, and was made an independent department.

In 1902 Dr. Guy Montrose Whipple was appointed lecturer in the department and assigned to the general field of the application of psychology to education. In 1904 Dr. Whipple was promoted to an assistant professorship. He gives a number of courses, including the following: Psychological basis of education; the study of adolescence in relation to secondary education; school hygiene; the education of defectives; mental development; experimental study of children, etc.

A graduate of Brown University, Professor Whipple did graduate work at Clark University for one year, and later at Cornell, where he took his doctor's degree in 1900. For four years before his appointment as lecturer on education, he served as assistant in the Cornell psychological department. Dr. Whipple has published some seven different studies in the *American Journal of Psychology,* and has had articles in *Science* and in the *Educational Review.*

In the six years ending 1904, the number of registrations aside from those in the teachers' courses in Latin, Greek, German, and English, has risen from 97 to 246. Since, however, Course I. in psychology, logic, and ethics is required for entrance to the courses in education, the registrations in the latter are necessarily limited.

In addition to the work of the department proper, a number of university professors have contributed important elements in the preparation of secondary teachers. Thus special courses are now maintained in Latin, Greek, German, and English, while a similar course in mathematics is projected for the near future.

Ancient, Mediæval, and Modern European History

To understand the development of the study of history at Cornell one must start a long way back. The first president of the university was himself a student and teacher of history. His interest in that subject, kindled in boyhood by the novels of Sir Walter Scott, had been quickened and vitalized by the live teaching of a young disciple of Channing who had interested him in the stirring episodes of our own politics then leading up to the Civil War.[1] At Yale no study had so moved him as his work with Professor (later President) Woolsey in Guizot's *History of Civilization.* From history were taken the themes of the essays by which he distinguished himself as a prize-winner in the last years of his course; and it was with a mind already half resolved to devote his life to the teaching of history that he set out for post-graduate study abroad. But what he heard in the lecture rooms of Paris and Berlin not only broadened and deepened his historical knowledge; it confirmed and reinforced thoughts already taking shape in his mind as to the whole place and method of history in American education. Not that he would transplant either the French or the German system as a whole. Much as he admired the work of a Ranke, he was unable to follow what seemed to him the esoteric rhapsodies of that great lecturer, and the trend of the German method toward minute research he thought academic and devitalizing. While he would give to history, as had been done in Europe, a far larger place in the schools, and would above all, by the more live lecture system, free it from the trammmels of mere text-book and recitation, which robbed the work of even a Woolsey of so much of its power, what he coveted for America should be more vital, varied, and immediately practical in its lessons than any historical teaching he found in vogue abroad. To the ripening of such thoughts contribution was made by his historical pilgrimages in France, Germany, and Italy, by that growing interest in contemporary European politics which inspired his great scrapbooks from European newspapers, by long chats with old Napoleonic soldiers at the Invalides, and especially by his experiences during the stirring epoch of the Crimean War as an attaché of our legation in Russia, when he not only came into direct touch with the making of history, but, inspired by the archives of the legation and by his talks with our minister, Governor Seymour (of Connecticut), he began his career as an investigator by researches into the diplomatic activities of Jefferson. It was just at this time, too, that he began the collection of his notable historical library, haunting old book-shops and antiquaries' dens in all corners of Europe in search of whatever could make more real to him or his future students the life of the past.

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[1] Mr. White has himself told the story of the birth and growth of his interest in history in his article "How I was Educated," in *The Forum,* 1887.

Returning to America in 1856, his bent toward historical study now became a purpose, and matriculating again at Yale for the year of graduate study leading to his mastership, these thoughts as to the place and worth of history in education grew more definite, and at last found a channel of utterance. His earliest magazine article, published in the *New Englander* of August, 1857, is an impassioned appeal for a more generous and a more vital use of history in American education. There had been given him for review new editions of the great universal histories of the German Schlosser and the Italian Cantú. Taking his text from these, but quite forgetting the text in its application, the young scholar thus set forth his dream:

"In spite of all show of argument to the contrary, we fully believe that by worthy historic study comes most excellent discipline. The best physical discipline comes not by drudgery; men wear out by that. . . . It is of the utmost importance that the student throw his heart into his work—and this not only for acquisition, but for discipline. Any study in which a man becomes fully interested is likely to become a good discipline. No study in which he is not interested can be truly so. Now historical study is the acknowledged love of these times. . . . Look through any newspaper article or student's essay; the chances are that the best arguments are clenched with history. The events of the last years of the last century, and first years of this, have stirred men to look more than ever at the movement of the nations. The interest, being so general and so deep, pledges the best of foundation to a healthy mental discipline in this study.

" But a still deeper error is the very idea of discipline. A healthy mental discipline is something more than a mere sharpening of wits, and its product is something higher than attorney-smartness or skill in critical mousing. They who earnestly trace with Grote the growth of the Athenian Republic, or with Motley the rise of the Dutch Republic, sharpen their mind, but in the study of the battle of Marathon, or siege of Leyden, there is strengthening of faculties deeper than are touched by any cold mental culture. And he who with Sismondi disentangles the confusions of the Italian republics, and sees ever farther and farther into the causes of their beauty in work and strength in fight, strengthens his mind. But he does better, for the work has not only brain, but heart. From certain chapters gush life-streams; lines of reasoning are the warm veins bringing in life; descriptions and recitals are its glowing arteries—carrying out life; cold sequences are thus made living growth; the story of a country is made Life of a People. Who studies such life does not merely build his mind on the cold granite base of syllogisms, but roots mind, heart, and whole higher nature deep in zeal for the living, and love for the true; and to natures thus rooted God is ever giving growth through all new light from new history, and all new warmth from old.

" Contemplation of the bearing of increased liberty on increased virtue, and of struggle of great good men with great bad men, strengthens a man's heart; study of the sure lines of justice, between noble thoughts and noble victories, strengthens a man's conscience; contemplation of great lines of purpose running through all that blooms or decays,—struggles or suffers in the world history,—connecting all with the great goal which God has set,—strengthens a man's soul. This is that higher discipline which gives mental discipline its worth; this repays all discouragement among old books, all buffeting among rugged men."

The dreamer was soon to test his theories by practice. Even before his article was in print he had accepted the professorship of history in the University of Michigan. In the autumn of 1857 he entered on its duties. "His instruction in history," wrote later one who then listened to him (his sometime successor, both at Michigan and at Cornell, Charles Kendall Adams), "was a genuine revelation to those who had been accustomed to perfunctory text-book work and the hearing of dry and colorless lectures. The exceptional excellence of his instruction consisted largely of the spirit which he infused into his students. He had in a remarkable degree the rare gift of seizing upon the most important principles and causes, and presenting them in such a manner as to illuminate the whole course of events with which they were connected. He not only instructed, but, what was even more important, he inspired. While he remained in his chair no study in the university was pursued with so much enthusiasm by the mass of students as that of history."[1]

It was not his students alone who profited. "Then began, perhaps," wrote Mr. White himself in later days, "the most real part of my education. I learned the meaning of the proverb '*docendo disces.*'"

It was with an experience thus enriched, and with his conviction of the practical need of historical training deepened by what he had seen result from the want of it in those days of national crisis, that in 1863 he

[1] For an account in considerable detail of his methods of instruction at the University of Michigan, see Professor H. B. Adams's *The Study of History in American Colleges* (forming Circular No. 2, 1887, of the U. S. Bureau of Education), pp. 94–100.

found himself called from the duties of a teacher to those of a legislator. Elected to the Senate of the state of New York, he was made the chairman of its committee on education. His part in this capacity in the creation of Cornell University has been elsewhere narrated. In the plan which, after the granting of its charter in 1865, he drew up for the organization of its instruction, he thus expressed himself as to the work in history.[1] " But there is one department regarding which, perhaps, some explanation is needed here—the department of jurisprudence, political and social science, and history.

" We believe that although there will be some attention to these subjects in the general course, there is need of a separate department devoted to a study of them, wider and deeper.

" In various connections with institutions of learning, and in various public employments, the committee have been convinced: ' First, that great numbers of the most active young men long for such a department, would work vigorously in it, and that these young men are, many of them, not attracted to the existing colleges; secondly, we believe that the state and nation are constantly injured by their chosen servants, who lack the simplest rudiments of knowledge which such a department could supply. No one can stand in any legislative position and not be struck with the frequent want in men, otherwise strong and keen, of the simplest knowledge of principles essential to public welfare. Of technical knowledge of law, and of practical acquaintance with business, the supply is always plentiful, but it is very common that in deciding great public questions exploded errors in political or social science are revamped, fundamental principles of law disregarded, and the plainest teachings of history ignored.'

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[1] In a note scrawled on the margin of a copy of this plan, Mr. Cornell expressed his approval of Mr. White's words, illustrating them further from his own experience. The note has, alas, been mutilated by a careless bookbinder.

"In any republic, and especially in this, the most frequent ambition among young men will be to rise to positions in the public service, and the committee think it well at least to attempt to provide a department in view of the wants of these; a department where there should be something more than a mere glance over one or two superseded text-books—where there should be a large and hearty study and comparison of the views and methods of Guizot, and Mill, and Lieber, and Woolsey, and Bastiat, and Carey, and Mayne, and others."

As president of the new institution, it fell to Mr. White himself to put these large projects into execution. But, alas! the financial resources of the young university were by no means equal to its ambitions. Not only at the beginning, but to the very end of Mr. White's presidency, the institution was "land poor," its income barely sufficing—and that only through great personal generosity on the part of its trustees—to meet its most pressing needs and to pay the taxes on those precious estates which were the hope of its future. Whenever expansion was possible, other departments pressed for funds. It was Mr. White's own decision that history must wait.

Yet even during this period of poverty something was accomplished. One chair, indeed, was filled at the outset. It was never the wish of the new president to lay down his work as a teacher. Such was not yet the custom in even the greatest American universities, and it would have been peculiarly distasteful to President White. For himself he reserved the headship of the historical department, his title to the end being "President and Professor of History"; and for his immediate field he chose the history of modern Europe, from the beginnings of the Renaissance to the present day. It was well for the struggling young institution that its president thus kept his touch with the work of instruction. All that had been true of his lectures at Michigan proved so again at Cornell. None were more eagerly sought by students, none so full of inspiration and of culture. They set a high standard for the work of all classrooms. They were to himself a change and a solace under the more irksome cares of administration. They gave him ever an access to the ear of the student body. Though his lectures, even in the Michigan days, had been largely committed to writing, and though at Cornell they took on yet more fully a permanent form, he was much too facile a speaker to become the slave of his manuscript. There were few episodes in that past of which he spoke which he could not enliven by some narrative of personal observation or make more real by some relic from his growing library. There were few questions, political or social, which fired his soul in the present, for whose discussion a text did not readily offer itself in the story of the past. To his students these excursions were perhaps of more worth than the set lecture which they interrupted. They brought them into a direct personal touch with a man of broad experience and lofty public spirit, and they gave a fresh and practical interest to the lecturer's every word. Yet even Mr. White's written lectures had in them a wealth of personal experience, a warmth of personal conviction, and a direct application to living issues which took them far out of the category of the usual academic delivery. Nor was he content merely to repeat his work from year to year. New lectures were constantly being added to his courses. To the one general syllabus of lectures on modern history which he brought with him from Michigan, but which was expanded in every successive edition printed for his classes, was added another dealing more minutely with the rise of the greater continental states. The frequent absences demanded by his presidency, and yet more his long stays abroad in 1876-78 and 1879-81, were, indeed, serious interruptions to his activity as a teacher. Yet even these were not without their compensations. Always an insatiate reader, and utilizing for this purpose even his journeys, these absences brought not only new growth to his library and enrichment to his store of observation, but they made possible excursions into fresh fields of study. Thus from his foreign sojourn of 1876-78 he brought back his new course on the evolution of humane action, with its grewsome details as to persecution and restraint of liberty; and from his German ministry, in 1879-81, his biographical studies on the great men—Grotius, Comenius, Thomasius, Lessing, Kant, Bismarck—whom he counted the leaders in the building up of modern Germanic civilization.

Despite Cornell's poverty President White was able, too, to recruit at the outset for history at Cornell one most notable colleague. Goldwin Smith, regius professor of history at the oldest and greatest of English-speaking universities, was minded to leave his brilliant place at Oxford and to cast in his fortunes with the transatlantic kinsmen who owed so much to his championship during their civil struggle. Mr. White, who had been brought into touch with the eminent Englishman by their common efforts for the cause of the North, and who found in one whose part had been so great in the reorganization of Oxford a ready ear for his own great educational dreams, was so happy as to win him for Cornell. Like Mr. White a man of private fortune, Professor Smith sought no other reward than a share in the shaping of the new enterprise. Accepting the chair of English history, he took up his abode in Cascadilla Place, where so much of the university's earliest life found shelter, and with humorous equanimity bore from 1868 to 1872 all the hardships of that crude time of beginnings. Not only would he accept no pay for his services, but he endowed his needy department with his own rich private library of English history. Yet those services were very great. To the young university, and especially to its department of history, the prestige of his name meant much. His lectures had the same charm of style which marks his written work. In person tall, slender, slightly stooping, his words, not easy at first to understand for those unfamiliar with a British accent, coming in jets, he used no manuscript, but the terse, epigrammatic sentences fell from his lips in a form as finished as if prepared for the printer. They were punctuated by few gestures or changes of expression, and only an occasional twinkle of the eye or a humorous contortion of the mouth betrayed the speaker's own consciousness of the humor in which they abounded. They drew always to his lecture room large audiences of faculty and townspeople as well as of students. Throughout the years of his residence Professor Smith bore his regular duties like any other member of the faculty; but when, in 1872, the institution seemed firmly on its feet, he sought release, then taking up his settled residence in Toronto, but for many years returning annually, year by year, for a course of historical lectures. It was a happy expression of its gratitude when in 1894 the university which had for a time dropped his name from the roll of its regular faculty, gave it permanent place there by making him a professor emeritus.

But even during the full activity of President White and the residence of Professor Goldwin Smith, a yet heavier burden of historical work fell on other shoul-

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ders—the broad shoulders of the "associate professor of history"—Professor William Channing Russel. In his care were the history of Greece and Rome, the history of the Middle Ages, the history of America. To him fell, at Professor Smith's going, the history of England. And, during President White's absences, he read also his lectures and examined his classes. When one adds to this that he was also professor of South European languages and vice-president of the university—a post never a sinecure, and for long periods carrying with it the acting presidency—it will be seen why too much must not be expected from him. Yet, whatever his success in other fields, there were few of his students in history who did not count him a great teacher. He was not, indeed, a trained historian; and it goes without saying that he had, while at Cornell, little leisure for research. He was not, like Professor Goldwin Smith, a gifted extempore speaker. His lectures, however sensible and well informed, had little of the grace of diction or of the poetic fervor which gave charm and inspiration to those of President White. But he knew how to interest his students and how to make them work. To a genuine love for history, especially in its institutional and constitutional phases, he added the training of a criminal lawyer. His courses in ancient and mediæval history were lecture courses; but his lectures were supplemented weekly by oral examinations so searching, so merciless, yet withal so illuminating, that no student will ever forget them, and few will remember them without gratitude. It is doubtless by his work in Roman history, the field most congenial to his own tastes and that which in student parlance gave its name to the whole series, that he will be longest remembered. The constitutional history of England and of America—and it was to their constitutional history that he practically restricted himself—he taught by another method not less fertile. Of lectures proper there were scarcely any. The subject was divided by him into topics. These topics were successively assigned, sometimes to the whole class, sometimes to groups or to individuals. The professor prepared for each topic a bibliography, naming usually not only the books to be studied, but volume and page as well. With the aid of these bibliographies, which were posted in the university library, it was the duty of each student to prepare a written paper covering systematically the subject in hand. It was the work of the classroom to analyze and discuss these papers, a discussion guided and summed up by the professor, but participated in by all the class. As actually conducted by Professor Russel, the method was, both in process and result, strikingly like the seminaria of the continental universities, though somewhat more elementary in sort; and, indeed, it was these which had much interested him during a visit abroad, to which he mainly owed the suggestion.

Such was the extent and such the character of the regular instruction in history at Cornell during the years of poverty which made up the administration of President White prior to his return from Germany in 1881. To this must be added, however, some very interesting courses by non-resident lecturers. In the fall of 1871 George Washington Greene was appointed a non-resident professor of American history. In 1872 the English historian, Froude, delivered at Cornell a course of lectures on the history of England. In 1879-80 the German historian, von Holst, then only sojourning in America, gave a half-dozen eloquent lectures on the history of the mediæval empire; and in the following year the American John Fiske delivered at Cornell the lectures which later became the nucleus of his well-written series of volumes on the history of America. Nor may one forget the valuable work in history done at Cornell in this period by her teachers of language and literature.

In 1881 came notable changes. President White returned from abroad and resumed his professional duties. Professor Russel left the university. In his place there was called from the University of Michigan to the first chair of American history yet established at any American university, Professor Moses Coit Tyler, while the instruction in ancient history, against whose abandonment vigorous protest was made by the departments of Latin and Greek, was entrusted to Assistant Professor William Rufus Perkins; and there also began his labors at Cornell, though at first only as a lecturer and in the neighboring field of international law, another young historian, Herbert Tuttle. It was also in this same academic year, 1881-82, that historical instruction at Cornell was diversified by the non-resident lectures of the English historian, Freeman. In the autumn of 1883 Professor Herbert Tuttle, whose services had thus far been shared with the University of Michigan, was gained wholly and permanently for Cornell by his appointment to an associate professorship of history and theory of politics and international law.

At the close of the year 1884-85 President White, resigning the presidency, resigned with it his professorship of history. There followed him, not only as president, but as professor of history, Dr. Charles Kendall Adams, who had been his successor in the same chair at the University of Michigan. At the same time Assistant Professor Perkins, whose quiet scholarship had perhaps never been adequately appreciated at Cornell, accepted a position at the University of Iowa, the instruction in ancient history being for a time assumed by the classical departments;[1] and from the University of Michigan with President Adams came Frank M. Hodder, who was appointed an instructor in history, with duties in the modern fields. By the opening of 1886-87 President Adams, who had meanwhile been studying the field, was ready for much graver changes. Persuading ex-President White now to consummate that gift to the university of his rich historical library, which had long been in prospect, he made this gift the occasion for a reorganization of the entire instruction in history, politics, and economics. To unify this under a single head, the trustees now, at his instance, created it "The President White School of History and Political Science." The deanship of this school having first been offered to ex-President White himself, but declined by him, it was President Adams's thought to call to the post some young and vigorous organizer, and he had fixed his eyes for the purpose on the energetic young head of the historical work at Johns Hopkins, Professor Herbert Baxter Adams. But a proposal thus to put over their heads a younger man, and one with whose methods they were by no means in hearty accord, was intolerable to men like Professor Tyler and Associate Professor Tuttle. So determined and so effective was their opposition that President Adams at last, with much reluctance, relinquished the effort, and the organization of the President White School was never fully completed. The trustees conferred upon Professor Tyler the title of dean, but the whole idea of such a centralization was obnoxious to him as to his colleagues, and though, at the wish of his associates and in view of his seniority, he presided in that capacity at the meetings of the faculty of the school, he was never willing to assume further executive responsibility. Meanwhile Associate Professor Tuttle was in 1887 raised to a full professorship, with the title (not wholly to his mind, since it excluded him from history proper) of " Professor of the History of Political and of Municipal Institutions and of International Law," and in 1890 was made, to his happiness, despite the reluctance of President Adams, professor of modern European history. Instructor Hodder, who, after a transfer in 1887 to political economy, had in 1888 been restored to history for the care of the work of Professor Tyler during the latter's year of sabbatical absence, returned in 1889 to economics with the title of assistant professor, and in 1890 left Cornell for a chair at the University of Kansas. And in 1888 Instructor George Lincoln Burr, who had already in 1881-84, while secretary to President White, held the half-nominal title of instructor and examiner in history, returned from his studies abroad to enter fully on his teaching at Cornell, becoming in the following year assistant professor of ancient and mediæval history; in 1891, associate professor, and in 1892, full professor of ancient and mediæval history. In the same year, 1892, the resignation of President Adams and his departure from Cornell made an end of another chapter of Cornell's work in history. Such attention as he had given to the instruction in history at Michigan had, indeed, never been possible to him at Cornell.[1] His executive duties had from the first much abridged his own valuable courses, and at last interrupted them altogether. His historical instruction devolved more and more upon others, and in 1889 he formally relinquished his title of professor of history. Yet his services to the department were great. It was at his instance and under his oversight that there had been fitted up, adjoining the university library, a special room for the use of research classes in history, and the seminary method of instruction was fully introduced as he had already introduced it at Michigan. For such work in history, as in other fields, much more abundant provision was made in the great new library building which grew to completion under his presidency. In the fine hall prepared for it in this building the President White Library, now the property of the university, was installed in the autumn of 1891. At the same time the conditions attached by Mr. White (not without suggestion from President Adams) to his gift went into full effect. It was to the professorship of modern European history thus stipulated that Professor Tuttle had been elected in 1890. To the historical librarianship provided was named Professor Burr, who, since his undergraduate days, had been Mr. White's custodian of the collections. The two President White fellowships—in modern European history and in political and social science—were likewise filled; and the annual appropriation stipulated for the increase of the historical library, supplemented as it was by the continued generosity of Mr. White, met, from this time on, a want from which the work in history had sorely suffered. Early in his stay at Cornell, President Adams had been much interested, too, in the organization of a university historical association, which should bring the teachers and students of the historical sciences into a closer acquaintance and a common activity; but its meetings, at first lively and well attended, languished and finally ceased. To the end of his administration President

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[1] The solid teaching in ancient history done, while it remained under their charge, by such scholars as Dr. Andrew Curtis White, Dr. Herbert Elmer Mills, and Dr. George Willis Botsford, should not here escape mention.

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[1] For a full and able account of his work as a teacher of history at the University of Michigan, see the already cited circular (1887, No. 2) of the United States Bureau of Education on *The Study of History in American Colleges and Universities.*

Adams retained an especial interest in the affairs of the department, contributing to its work by many a fruitful suggestion. But for the deep want of sympathy between himself and Professor Tuttle, and the distrust caused by the attempt at reorganization, he doubtless would have had a much larger place in its counsels.

His successor in the presidency, Dr. Schurman, who as the head of the kindred department of philosophy had already come into close and kindly relations with all the members of the historical faculty, found himself much less hampered in his dealings with them. Professor Tuttle, however, was not long to survive the departure of President Adams. A chronic trouble of the throat had long caused anxiety to his friends, and now symptoms of mental disorder were beginning to show themselves. Neither medical treatment nor lightened work nor protracted absence from his duties availed to check the progress of disease. Before the end of 1893 the evidences of paresis were unmistakable. On the morning of Commencement Day, 1894, he breathed his last. Yet up to within the last months of his life he had retained some relations with his classes, and almost to the very end he continued to toil sanely at his great unfinished History of Prussia, whose demands upon him were perhaps in no small degree responsible for his mental collapse. His age was but forty-four. He had brought to his work as a teacher the maturity of long experience as a student of public affairs and as a journalist at European capitals. To a trained insight and a keen and ripe judgment he added a fearless conscientiousness and a power of exceptionally clear and cogent statement. Caustic of temper and impatient always of crude or shallow work, the growing austerity doubtless due to breaking health narrowed his classes and somewhat marred his influence; but few teachers have more effectively stimulated to fruitful effort and to wise caution their earnest students.

To fill the place of such a man was not easy. After looking carefully over the American scholars available for the position, President Schurman, having an errand in Great Britain, continued his researches on that side of the sea; and there he secured for the vacant chair a well-known English writer and teacher of history—Henry Morse Stephens. Professor Stephens followed him at once to America and entered on the duties of his post the same autumn. He was then a man of thirty-seven. His field of work remained the same as Professor Tuttle's, save that by an exchange, welcome both to himself and to Professor Burr, he relinquished to the latter the period of the Renaissance and the Reformation to the end of the sixteenth century, adding instead to his work in the history of England that mediæval portion which Professor Burr had theretofore taught—his title accordingly being subsequently changed to that of professor of modern European history and of English history. Professor Stephens's lectures were from the first exceedingly attractive, and he soon became to an unusual degree a favorite with the undergraduate body. An especial inducement to his acceptance of the American invitation had been the facilities offered by the wealth of the President White Library for the continuance of his researches in the history of the French Revolution; and, as was natural, the attention of his students was especially drawn to studies in this field. But his historical interests were broad and his energies untiring. Through him the university took a leading part in the establishment of the *American Historical Review,* of which he became one of the editors; and he was soon a notable figure in the American Historical Association, to whose formation, a decade earlier, Presidents White and Adams and Professor Tyler had largely contributed. Professor Burr was meanwhile drawn for a time into the national service as historical expert to President Cleveland's commission on the Venezuela-Guiana boundary, and, sent abroad for research in European archives, returned only after the lapse of a year to his university duties.

Just at the close of the year 1900, history at Cornell suffered an irreparable loss by the death of Professor Moses Coit Tyler. His illness, unforeseen and brief, interrupted him at the very height of his activity, and his age, but sixty-six, had seemed to promise years of further usefulness. His character as a teacher and the development under him of the study of American history at Cornell are discussed in other pages. To his chair was called, in the autumn of 1901, his pupil and friend, Professor Charles Henry Hull, who for some time prior had held at Cornell a chair in the department of economics, but whose interests had always been predominantly historical in character.

In 1902 came another great loss. Professor Stephens accepted a call to the University of California. Instead of attempting to replace him by a single mature scholar, it seemed wise to call in two younger men. To Dr. Ralph Charles Henry Catterall, invited from the University of Chicago, was assigned the major part of Professor Stephens's field, with the title of "Assistant Professor of History in charge of Modern European History," while to Dr. Henry Augustus Sill, fresh from long study abroad, was assigned, with the title of "Assistant Professor of History in charge of Ancient History," the work in the history of Greece and Rome, heretofore under the care of Professor Burr, with such part of the field of Professor Stephens as, with the concurrence of Professor Catterall, it might seem wise to entrust to him. Dr. Sill entered at once on his duties, adding to his courses in ancient history the elementary instruction in the history of England. Dr. Catterall, as had been arranged, devoted first a year to study in Europe, not assuming his position at Cornell until the fall of 1903.

With nearly all its chairs thus newly manned, a new period has been entered by history at Cornell. It is a period full of promise, but its history is yet to be written.

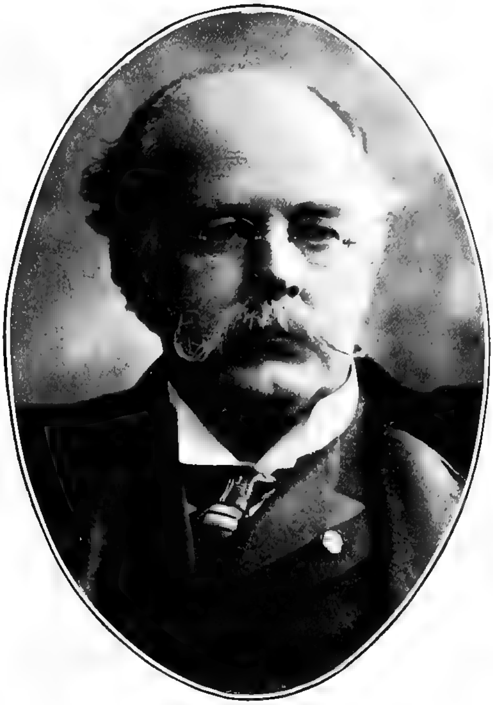
American History

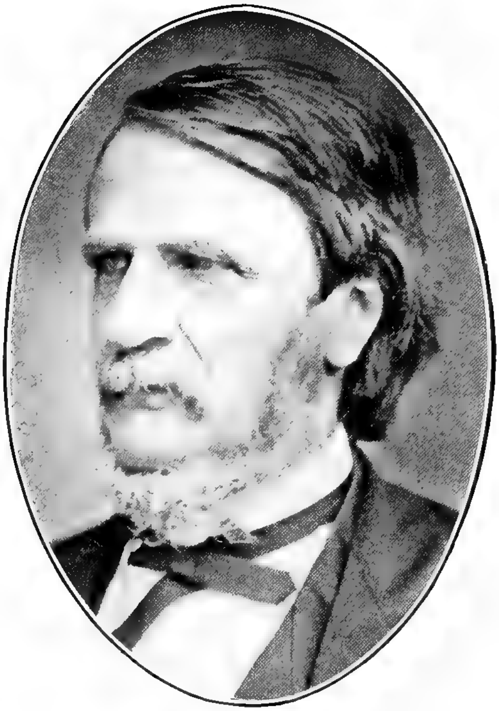
As early as the year 1868, President White had suggested the establishment of a chair of American history as one of the necessities in the future education of this country, and in his report to the trustees of the university for 1871-72 he had said: " As regards history, it is not known that any institution in the country has so extended a course, but there is a needed addition here, and I hope at an early date to see the history of our country fairly and fully treated. It is a curious fact, and one not very creditable to our nation, that at present if any person wishes to hear a full and thorough course of lectures on the history of this country, he must go to Paris or Berlin for it. That the subject can be made interesting is shown by the crowds who flocked to the lecture rooms of Neumann, the German, or Laboulaye, the Frenchman. That it is important needs no proof. We ought soon to have a series of lectures, with judicial fairness going over the great periods of our history, doing justice to all parties and being unduly enthralled by none. My plan would be to take four or five thoughtful men and assign to each a period, say to the first, the colonial period; to the second, the period of the Revolution; to the third, the period from the Revolution to the War of 1812; to the fourth, the period extending from the War of 1812 to the beginning of our Civil War. I believe that such a course well prepared would be a powerful instrumentality in sending out from this institution a great body of men above the level of mere partisanship and beyond reach of corruption.'' On September 22, 1871, George Washington Greene was appointed non-resident professor of American history for one term. Professor Greene had resided for many years abroad. In his first trip to Europe he had met by accident at an inn in southern France Mr. Henry W. Longfellow, and the friendship then formed grew with the succeeding years of their lives. Mr. Greene had made an exhaustive study of the period of American history at the close of the last century, for the preparation of an elaborate life of his grandfather, General Nathanael Greene, one of the bravest soldiers of the Revolutionary War. Mr. Greene was a man of gentle spirit and delightful personality, full of reminiscences of his varied experiences, and of the famous men with whom he had been associated abroad, but of delicate health. His lectures were read quietly from manuscript. They were delightfully written, but lacked, perhaps, a distinctively didactic character. Authorities upon American history were cited, but little work on the part of the students seems to have been done apart from attendance upon the lecture course. Mr. Greene's lectures were delivered first in the spring of 1872.

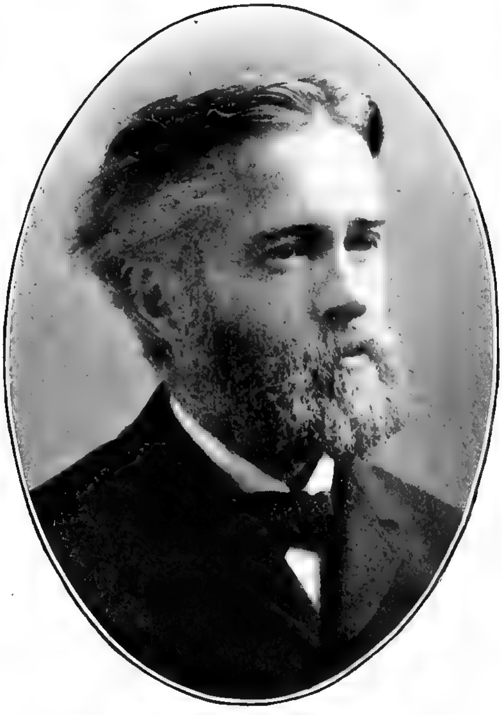
Professor William Channing Russel's work was confined at first to mediæval and modern history. While closely uniting the study of text-books with lectures, he also embodied one feature of the modern seminary plan by occasionally requiring essays upon certain subjects studied. These essays did not have the character of original investigations, but rather of a systematic presentation by the student of the main facts bearing upon a given question. Later, Professor Russel assumed systematic instruction in American history, which was continued as long as he remained connected with the university.

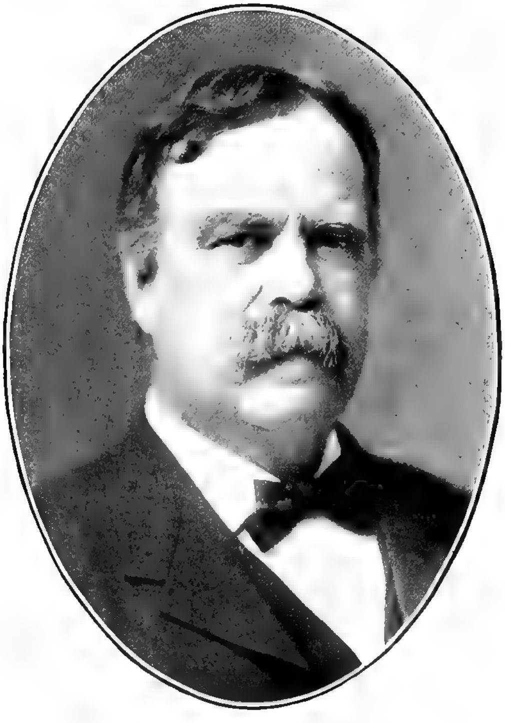
In 1878 a two years' course in history and political science went into operation, which continued for three years. It included most of the instruction in history which was given in the university, and involved few requirements for admission save the ordinary examinations and four books of Cæsar. In 1881 this course was extended to four years. Students who had completed the first two years of study in arts, literature, or philosophy, might be admitted to full standing as juniors in the course in history and political science, on passing a satisfactory examination in the history required in the first two years of this course. The first two years in the enlarged course were devoted to the languages, and to elementary mathematics and history.

Upon the resignation of Professor Russel in 1881, Professor Moses Coit Tyler, of the University of Michigan, was elected to the vacant chair of history in Cornell University. After accepting the position he was permitted, at his own request, to devote himself to instruction in the field of American history exclusively. At the time of Professor Tyler's appointment no department of American history existed in any university in the country; but it was the strong conviction of the new incumbent of this chair at Cornell that the time had come when the claims of our own national history were to be more distinctly recognized in the arrangement of historical instruction in American universities. This conviction has since been abundantly justified, not only by the steady growth of the new department here, but by the fact that the example thus set by Cornell has been followed by many other universi-









Estevan Antonio Fuertes

(Late Dean of the College of Civil Engineering)

George Chapman Caldwell

(Prof. of Chemistry, Emeritus)

William Channing Russel

(Vice-President, 1870-1876)

Lucien Augustus Wait

(Prof. of Mathematics)

ties, with the probability that it will in the course of time be followed by them all.

In the study of American history, Professor Tyler held that while the method should be thoroughly scientific, its object should be practical. He said: "To this extent I believe in history with a tendency. My interest in our own past is chiefly derived from my interest in our own present and future, and I teach American history not so much to make historians as to make citizens and good leaders for the state and nation. From this point of view I decided upon the selection of political topics for special study. At present I should describe them as follows: The native races, especially the mound-builders, and the North American Indians; the pre-Columbian discoveries; the origin and enforcement of England's claim to North America, as against competing European nations; the motives and methods of English colony-planting in America in the seventeenth and eighteenth centuries; the development of ideas and institutions in the American colonies with particular reference to religion, education, industry, and civil freedom; the grounds of intercolonial isolation and intercolonial fellowship; the causes and progress of the movement for colonial independence; the history of the formation of the national constitution; the establishment and growth of political parties under the constitution; the history of slavery as a factor in American politics, culminating in the Civil War." Professor Tyler emphasized the use of the historical library by the students.

Professor Moses Coit Tyler, who had thus become the first professor of American history in the university, was born in Griswold, Conn., August 2, 1835, and graduated at Yale in 1857, where he received later the degree of Master of Arts (1863). He devoted himself at once to the study of theology at Yale, and later at

Andover Theological Seminary. Upon completing his theological studies he became pastor of the Congregational Church in Owego, and subsequently in Poughkeepsie. His interest being pre-eminently literary rather than in preaching, he became an editorial writer upon the New York *Christian Union,* and later resided for a considerable time in England, where he delivered popular lectures upon Dio Lewis's System of Light Gymnastics, a subject to which his attention had been called by the needs of his own health. Professor Tyler often remarked that this experience of dealing with popular audiences was of very great value to him. He studied carefully the effect of different parts of his speeches upon his audiences, and thus gained a valuable knowledge of what features in a popular address are most effective. He published while abroad a book upon gymnastics, *A New System of Musical Gymnastics as an Instrument in Education* (1864), and a clever little volume on *London from the Top of an Omnibus;* also the *Brownville Papers* (1868).

From 1867 to 1881 he was, with the exception of a few years, professor of rhetoric and English literature, and of the English literature and language, in the University of Michigan. He prepared there a volume entitled *Direct Study of English Masterpieces: Shakespeare Course* (1877), where also he began his important work upon the history of American literature, the separate volumes of which were published at intervals of many years: *The History of American Literature during the Colonial Period,* 1607-1765, in two volumes (1878), and a *Literary History of the American Revolution* (1897). Professor Tyler also wrote an interesting *Life of Patrick Henry* (1888); a volume of special studies entitled *Three Men of Letters* (1894), (1895), also *Glimpses of England* (1898). He became a deacon in the Episcopal Church in 1881, and a priest in 1883.

Of his work on American literature it was said: " It is a book truly admirable both in design and in general execution, the learning is great, the treatment wise, the style fresh and vigorous. Professor Tyler may almost be said to have created not only his volumes but his theme . . . at any rate, he has taken a whole department of American history, rescued it from oblivion, and made it henceforward a matter of deep interest to every thinking mind." From the character of Professor Tyler's work it is seen that his interest was in literary rather than political history. At the same time he was an interesting lecturer, graphic in style, graceful in expression, and his lectures were enlivened with a charming humor. The drudgery of a professor's chair was not attractive to Professor Tyler, whose main interest was in continuing his notable work.

Professor Tyler gave courses of lectures upon " American history from the earliest discovery to the War for Independence," " American history from the end of the War for Independence to the present," " American constitutional history " with lectures and the direct study of constitutional documents, and topical reports.

Upon the death of Professor Tyler, Dr. Charles Henry Hull, who had held the position of instructor in political science, and later an assistant professorship in political economy, was transferred to this important chair. Dr. Hull graduated at Cornell in the year 1886, and later pursued the study of history, economics, and public law in Göttingen, Florence, Berlin, and Halle, from which latter university he received the degree of doctor of philosophy, *magna cum laude.* Dr. Hull had been secretary of the American Economic Association, and editor of its publications. He is also the author of a volume in German on the *Finances of the Imperial German Parcels Post* (1892), and has published an edition of the *Economic Writings of Sir William Petty* in two volumes. His studies in finance, as well as in the constitutional and industrial history of New York from its earliest settlement, had given to him a preliminary preparation for this important field. He has delivered courses of lectures upon "American history from the period of discovery to the adoption of the Constitution," "The history of the United States since 1877," "The constitutional history of the United States to 1861," "The political and constitutional history of the Civil War and of reconstruction," "The expansion of the English in North America to 1867," and "The economic history of the United States." In order to emphasize the study of the history of our own state, an instructor has been appointed to give instruction entirely in this subject.

Economics, Political and Social Science

In 1868, when Cornell University opened its doors, the teaching of political science and political economy at Harvard University was confined to a part of the course in logic and philosophy required of seniors during one term. The subject was taught by the professor of natural religion, moral philosophy, and civil polity, who was also the university registrar. In Columbia College the subject was assigned an equally subordinate place as a pendant to philosophy, the senior class studying for the first term the philosophy of the intellect and feelings, and for the second term advancing to the philosophy of the will and political economy, and the teacher being the professor of moral and intellectual philosophy and English literature. These two are typical of the recognition then accorded to the social sciences in the best American universities.

The man who was to become the first president of Cornell University had written eleven years before:

" No graduate ought to leave an American university without being able to show concisely what slavery wrought in all republics of the ancient world," and " to make good the position that no republic before ours ever secured civil liberty " (*New Englander,* xv., 414, 1857).

In the report to the Trustees of Cornell University by the Committee on Organization, which was presented two years before the university opened, Mr. Andrew D. White recommended the organization of a " Department of Jurisprudence, Political Science, and History," co-ordinate with the " Department of Law." In explanation and defense of this proposal he wrote: " The state and nation are constantly injured by their chosen servants who lack the simplest rudiments of knowledge which such a department could supply. . . . It is very common that in deciding great public questions, exploded errors in political and social science are revamped, fundamental principles of law disregarded, and the plainest teachings of history ignored. . . . There is a great branch of instruction here for which the existing colleges make no adequate provision." In enumerating the professorships that should " be filled at an early day," the report included in addition to the professorship of philosophy, and the professorship of history, a professorship of political economy. It was the judgment of the committee, however, that advanced teaching in political economy during the early days of the university might be secured by the election of a non-resident professor. Accordingly the first announcement of the university adds to its brilliant list of non-resident professors, as first on the list of those " to be filled at an early day," a professorship of political economy.

But the pressure of more imperative duties delayed the fulfillment of these plans. During the first years of the university's life, however, lectures were given to seniors during each second term "On Moral and Political Philosophy, and the Elements of Political Economy," the teacher being Rev. W. D. Wilson, professor of moral and intellectual philosophy and registrar.

Dr. Wilson had been trained in theology at the Harvard Divinity School, and had been a clergyman for twelve years when he was appointed professor of moral and intellectual philosophy at what is now Hobart College. After eighteen years of service at that institution he accepted an invitation to a similar chair at Cornell University, in which position he remained until his retirement as professor emeritus in 1886. The fruits of his study and experience in the classroom were published in 1875 under the title: *First Principles of Political Economy with Reference to Statesmanship and Progress of Civilization,* a textbook extensively used in its day.

A course on American Constitutional History given by non-resident professor Theodore W. Dwight of New York City, was the nearest approach to instruction in political science during the first period of the university's life. In the light of subsequent development, specialization in these fields seems to have made hardly more than a mere beginning during Cornell University's earlier years. It should be remembered, however, that the priceless privilege of hearing the lectures of President Andrew D. White and Professor Goldwin Smith was then open to students. The broad conception of history which they cherished, and the deep meaning which they were so well able to give it, afforded a training in the fundamentals of economic and political science which many a modern department with its larger equipment and more numerous staff might envy.

With the coming of Drs. H. C. Adams and Herbert

Tuttle during the year 1881-82, the scope of instruction in economics and politics was greatly widened. Although at first Dr. Adams spent but half the year at Cornell, devoting the rest of his time to Michigan University, he nevertheless succeeded while here in developing courses in advanced political economy, practical questions in economics, and in the principles and practice of finance. His fertility as an investigator and writer found expression in the publication in 1887 of an extended work on *Public Debts,* which has won for itself the position of a classic in the field of finance. Dr. Tuttle was also handicapped at first by being obliged to work under restricted limitations as to time. His courses in systematic and theoretical politics, and in international law, laid the foundations of specialized work in political science at Cornell University.

The vigorous work done under great difficulties by Drs. Tuttle and Adams was supplemented by valuable outside assistance. In 1883, Professor R. T. Ely lectured at Cornell during the first two weeks of the winter term on " French and German Socialism "; in 1884 Mr. Ellis H. Roberts delivered a course of lectures on the tariff; and in 1885, courses on diplomacy and international law were given by the Hon. Eugene Schuyler. Three books, each of recognized merit in its own field, remain as permanent monuments to the work of these gentlemen at Cornell: Dr. Ely's *French and German Socialism* being published in 1883; Mr. Roberts's *Government Revenue* appearing in 1884; and Mr. Schuyler's *American Diplomacy and the Furtherance of Commerce* in 1886.

President Andrew D. White's support was freely given, not only to these but also to every other early achievement in economics and politics at Cornell. One of the first and gravest difficulties which he had to meet was the venomous partisanship of the times, resulting from the struggle over protection. To this cause much of the popular interest in economics was due, and the impetus thus given to its study in the universities can hardly be overestimated. Yet there were hot jealousies on either side, each demanding conformity to its doctrines and the two sides agreeing in hardly anything except the belief that the free trade-protection controversy was the whole science of economics. As early as 1871, President White was ready with a solution of this difficulty. Two lectureships in political economy should be established," he wrote, " to which leading advocates of the two great sides in political economy might be called. . . . Both parties being represented, neither could complain."

In his annual report for 1883, President White returns to the subject of instruction in political science with an expression of his earnest desire that the university should " send a body of young men out into the world fitted to discuss political and social questions intelligently " (*Annual Report*, 1883, p. 21). While laying stress upon this practical end of intelligent citizenship, he maintained that work in economic and political science might be made an excellent means of mental discipline. " A large class of young men," he wrote in the same report, " to whom the literatures of Greece and Rome seem remote, and mathematics, metaphysics, and physical science unattractive, can be stimulated intellectually by studies bearing upon the political and social problems immediately about them. Their daily life, to say nothing of their ambition, leads many to take a direct practical interest in such questions, and I earnestly hope that the trustees will continue to support the faculty in their exertions to make the course a success." In his report for 1884, President White made an able plea for the scientific study at Cornell of the problems of pauperism, intemperance, crime, and illiteracy, laying especial stress upon the inspection by teacher and students of neighboring eleemosynary and penal institutions. A year later, Mr. Frank B. Sanborn, secretary of the Massachusetts Board of Charities and of the American Social Science Association, was secured to take charge of the work of this character. The success of this venture, probably the first of its kind in the history of education, was most encouraging. Mr. Sanborn's courses were repeated each year until 1889, when he was succeeded by Professor C. A. Collin, who carried on work of a similar character for two years. At the present time the interest in the study of philanthropy at Cornell is so great that two courses are given, one of an elementary character, and the other designed to equip advanced students for research work in the history and statistics of charities and criminology. Meanwhile, the innovation suggested by President White has been taken up by practically every institution in the country which devotes much attention to the social sciences. As a result, in part at least, of this academic impulse, public opinion on philanthropic and penal questions is more intelligent and active than it was two decades ago, to the immense and evident betterment of the wards of society everywhere in America. President White's initial activity in behalf of this beneficent cause is a striking example of the practical foresight shown in all his recommendations for the development of economic, political, and social science at Cornell University.

In 1887 the university at last found itself in a position to arrange full professorships for Drs. Tuttle and H. C. Adams. They were thus enabled to spend the whole of each year at Cornell, and an immediate broadening of the work in politics and economics was the result. Under these men and at this time the department took on substantially its present form and methods. Dr. H. C. Adams is still remembered by many former Cornell students for his cordial personal attitude toward them and for his vast enthusiasm in his subject. While pleasing as a lecturer, his seminary afforded him a more congenial field of labor, and in the opinion of competent authorities it ranked as one of the best in the country. Dr. Tuttle's interest was chiefly in history, to which he finally devoted himself entirely, but his work in politics at Cornell was seminal. The present course in political institutions is substantially the same in outline as Dr. Tuttle's earlier systematic politics. His work in international law was also very interesting and thorough. It is the opinion of all who heard them that Dr. Tuttle's lectures were models of vigor, logical arrangement, and simplicity of language.

The four years, 1888-92, were marked by many changes in the personnel of the department. In 1888, Professor H. C. Adams was called to the University of Michigan as professor of political economy and finance, a position which he still holds. Since 1887 his talents have also been utilized by the government in the important position of statistician to the Interstate Commerce Commission. Professor Adams's place at Cornell was filled by the appointment of E. Benjamin Andrews, now chancellor of the University of Nebraska. After only one year's service at Cornell, Professor Andrews was called to the presidency of his *alma mater,* Brown University. During his residence here, outlines of his course of lectures were printed for the use of students, afterwards being put into book form under the well-known title, *Institutes of Economics.* During the year succeeding Professor Andrews's departure (1889-90), Assistant Professor Frank H. Holder, who had been instructor in economics from 1886 to 1889, took

HISTORY AND POLITICAL SCIENCE

Jeremiah Whipple Jenks
Walter Francis Willcox

George Lincoln Burr
Frank Albert Fetter

over the work of the department. In 1890 he was called to the professorship of American history and administration at the University of Kansas. With the appointment in that year of J. Laurence Laughlin as professor, and A. C. Miller as assistant professor, of political economy and finance, work has continued on a more generous scale. In spite of these frequent changes in the instructing staff, attendance increased rapidly, more than outstripping the multiplication of courses. The establishment of two fellowships in political economy in 1891 greatly strengthened the facilities of the department for graduate work.

In 1891 Professor J. W. Jenks was called to Cornell as professor of political, municipal, and social institutions, Professor Tuttle having been made professor of modern European history. Professors Laughlin and Miller resigned in 1892 to accept positions in Chicago University. Their places were filled by Dr. Edward A. Ross, who was made associate professor of political economy and finance, Dr. Walter Willcox, assistant professor of social science and statistics and political economy, and Dr. Charles H. Hull, instructor in political and social institutions. On the departure of Professor Laughlin, work in the department was reorganized with Professor Jenks at its head. After one year at Cornell, Professor Ross accepted a call to Leland Stanford Jr. University in 1893.

To fill the vacancy thus created, Lucius S. Merriam, who had just received his doctor's degree at Johns Hopkins, was made instructor in economics and public finance. After only two months' service at Cornell, Dr. Merriam lost his life in a sad accident on Lake Cayuga (Nov. 18, 1893). Although only twenty-six years old at the time of his death, he had already come to be regarded as one of the most promising of our younger economists. An article which he had published in the *Annals of the American Academy of Political and Social Science* (Vol. III, p. 483, Jan., 1893), on the *Theory of Final Utility in its Relation to the Standard of Deferred Payments*, was referred to by Professor J. H. Hollander as a " splendid constructive study." Among the many tributes to his memory presented in the Johns Hopkins Studies for 1894, Professor John B. Clark of Columbia University speaks of Dr. Merriam as " one destined to be a leader of thought," while Professor T. N. Carver, now of Harvard, calls him " one of the clearest headed, highest minded, and warmest hearted men I have ever known." His untimely death was mourned by many teachers of economics in the country, but it was nowhere felt more keenly than at Cornell University.

Dr. Frank A. Fetter, who had been fellow at Cornell in 1891-92, and who had spent the two succeeding years in travel and study in Europe, was recalled to the university as instructor in economics in 1894. He left the year following to accept a professorship of economics and social science at Indiana University. Dr. Charles J. Bullock succeeded him, remaining at Cornell from 1895 to 1898, when he was called to Williams College, and later to Harvard. With these exceptions, no changes occurred in the personnel of the department until 1901, when Professor Hull resigned the assistant professorship of political economy to become head of the department of American history. The resulting reorganization of the department gave it, for the first time in its history, three full professorships, occupied as follows: Professor W. Jenks, political economy and politics; Professor Walter F. Willcox, political economy and statistics; Professor Frank A. Fetter, political economy and finance. At the present time two instructors and four fellows and assistants are also engaged in the work of the department.

Any attempt at departmental bibliography would far transcend the limits of this historical sketch. It should be said, however, that the best traditions of the department have been maintained in this respect. Professor Willcox is the author of a number of articles and monographs mainly statistical in method on marriage and divorce, negroes, migration, and the census. Professor Fetter has written extensively on charities and economic theory. Professor Jenks has at various times prepared many valuable official reports and documents. Particularly worthy of mention, however, is his book on *The Trust Problem,* published in 1900 (second edition, 1902). Combining as it does the insight of a practical business man with the wide reading, careful observation, and keen logic of the trained scholar, it is doubtful if any recent book on economic subjects has more profoundly affected public opinion.

No better evidence of the usefulness of a department can be presented than a record of the service to which its young men have devoted themselves. The following partial list takes account only of graduate students who represent, of course, a small proportion of the total number who have received instruction in economics and political science at Cornell. In the service of the government are E. D. Durand, Special Agent, Bureau of Corporations, in the newly created Department of Commerce and Labor; C. E. Edgerton (Fellow 1897-98), Statistical and Editorial Assistant, Bureau of Statistics, Department of Agriculture; J. C. Hanson (Fellow 1889-90), Chief of the Catalogue Division of the Library of Congress,—all of Washington, D. C.; and E. W. Kemmerer (Fellow 1889-1901), Financial Adviser in the Office of the Treasurer of the Philippine Archipelago, Manila, P. I. Adna F. Weber (Fellow 1895-96) is now Chief Statistician of the New York State Department of Labor at Albany, N. Y. Another branch of expert statistical work is represented by F. S. Crum (Fellow 1894-95), who is Assistant Statistician in the Actuarial Department of the Prudential Life Insurance Company at Newark, N. J. O. L. Elliott (Fellow 1885-86), is Registrar of Leland Stanford Jr. University. Practical charity is represented by C. M. Hubbard (Fellow 1892-93), Secretary of the Charity Organization Society, Cincinnati, Ohio. Mr. L. Carroll Root (Fellow 1892-93) is Secretary of the Sound Currency Committee of the Reform Club of New York City, and vice-president of the New York Security and Trust Co. J. G. Rosebush (Fellow 1901-02) is traveling agent for the Bureau of University Travel with offices in the principal European capitals. The list of teachers is long and represents a wide range of educational work. D. K. Goss (Fellow 1892-93) is the founder and head of the American College at Strassburg, Germany. F. S. Edmonds (Fellow 1894-95), Professor of Political Science in the Philadelphia High School. E. M. Wilson (Fellow 1893-94), Principal of the Washington, D. C., High School. F. S. Shepherd (Fellow 1895-96), Principal of the Asbury, N. J., High School. H. J. Gerling (Fellow 1895-96), Teacher, St. Louis High School. W. B. Guitteau (Fellow 1900-01), Teacher, Toledo, Ohio, High School. To the colleges and universities of the country the department has contributed a large number of teachers of economics and political science, of whom the following may be mentioned: Herbert E. Mills (Fellow 1886-88), Professor of Economics, Vassar College, Poughkeepsie, N. Y. Willard C. Fisher (Fellow 1888-89), Professor of Economics and Social Science, Wesleyan University, Middletown, Conn. Frank A. Fetter (Fellow 1891-92), Professor of Economics and Public Finance, Cornell University. Thorstein B. Veblen (Fellow 1891-92), Assistant Professor of Political Economy, University of Chicago. T. N. Carver (Fellow 1893-94), Assistant Professor of Economics, Harvard University. W. A. Rawles (Fellow 1895-96), Associate Professor of Economics and Social Science, Indiana University, Bloomington, Ind. W. H. Glasson (Fellow 1896-97), Professor of Political Economy and Social Science, Trinity College, Durham, N. C. J. B. Phillips (Fellow 1896-97), Professor of Economics and Sociology, University of Colorado, Boulder, Col. Roswell C. McCrea (Fellow 1899-1900), Professor of Political Economy and Sociology, Bowdoin College. J. A. Tillinghast (Fellow 1901-02), Professor of History and Economics, Converse College, Spartanburg, S. C. Robert C. Brooks (Fellow 1897-99), Instructor in Political Economy, Cornell University. N. A. Weston (Fellow 1898-99), Instructor in Economics, Illinois University. H. S. Smalley (Fellow 1901-02), Assistant in Economics, University of Michigan.

In his address as president of the American Economic Association delivered in 1899, President Hadley of Yale called attention to the opportunities for larger public service open to the economics of the country. "I do not undervalue for a moment the importance of economic theory," he said. "I have the highest conception of the work of our economists as teachers of science. But I believe that their largest opportunity in the immediate future lies not in theories, but in practice, not with students, but with statesmen, not in the education of individual citizens, however widespread and salutary, but in the leadership of an organized body politic." In line with the opinion thus expressed by President Hadley, the government of New York State and of the United States has had occasion in recent years to make numerous demands upon the department of economics and social science at Cornell. The department and the university, appreciating the importance and public utility of the services called for, have always responded most generously.

At the request of Mr. Roosevelt, then governor of the state of New York, Professor Jenks gave valuable assistance in 1899-1900 to the special joint commission of the legislature for the revision of the tax system of the state. He was also active in the preparation of the New York Companies Act of 1900. A year later he was appointed expert agent of the United States Industrial Commission in general charge of the trust investigation. In this capacity he selected the witnesses to be examined, edited their testimony, gathered outside statistical material of all kinds, and finally had general editorial charge of the work of preparing the volumes of the Commission's report dealing with the trust question. Foreign and American students alike agree in regarding this work as one of the best reports upon industrial subjects ever issued by our government. During his Sabbatical year, 1901-02, Professor Jenks made a tour around the world, investigating on the way the government of dependencies, and the money and labor questions in the Orient. A valuable report to the United States War Department was the result of these studies. In December, 1902, Professor Jenks was called to Mexico to give expert advice to the government of that country with regard to a new monetary system which it contemplated introducing. The following summer he was appointed by President Roosevelt a member of the Commission on International Exchange, in which capacity he spent four months visiting leading statesmen and financiers in London, Paris, The Hague, Berlin, and St. Petersburg. Entire success attended this mission, and on his return to America, Professor Jenks was chosen to go to China, Japan, and the Philippines to take further steps necessary to the carrying out of the reform plans of the Commission on International Exchange. In 1899 Professor Walter F. Willcox was appointed by Governor Roosevelt as member of the New York State Board of Health, and the same day tendered a position as one of the five chief statisticians of the XIIth Federal Census, his duties in the latter position requiring a leave of absence and residence in Washington for two years. In the winter of 1903, Congress authorized the preparation of a report on census work in other countries, and Professor Willcox was chosen to go abroad the following summer to execute this commission.

While the absence of such teachers as Professors Jenks and Willcox temporarily interrupts the smooth workings of the department, this disadvantage is more than compensated by the enhanced value of their class work on their return due to the opportunities they have enjoyed for laboratory work upon political, social, and economic questions.

The growth of attendance in the department during the past decade shows a gratifying increase of interest in economic, social, and political science at Cornell. In the year 1893-94, which may be considered as exhibiting the condition of affairs immediately after Professor Jenks had reorganized the department, a staff composed of one professor, two assistant professors, and one instructor, or four men altogether, gave courses with a total attendance of 310. The absence of Professor Jenks makes the year 1903-04 less favorable for purposes of comparison, the instructing staff composed of one professor, two assistant protwo instructors, and one assistant, or five men in all. The attendance, however, was 473 altogether, an increase of 50 per cent. over the figure for 1893-94. During the decade the average attendance per class increased from about 21 to 31. In 1893-94, the elementary course in economics, which is regarded as general preparatory to further work in the department, was divided into only two sections for discussion work. At present there are six of these sections with an average attendance of nearly 30 in each.

Mathematics

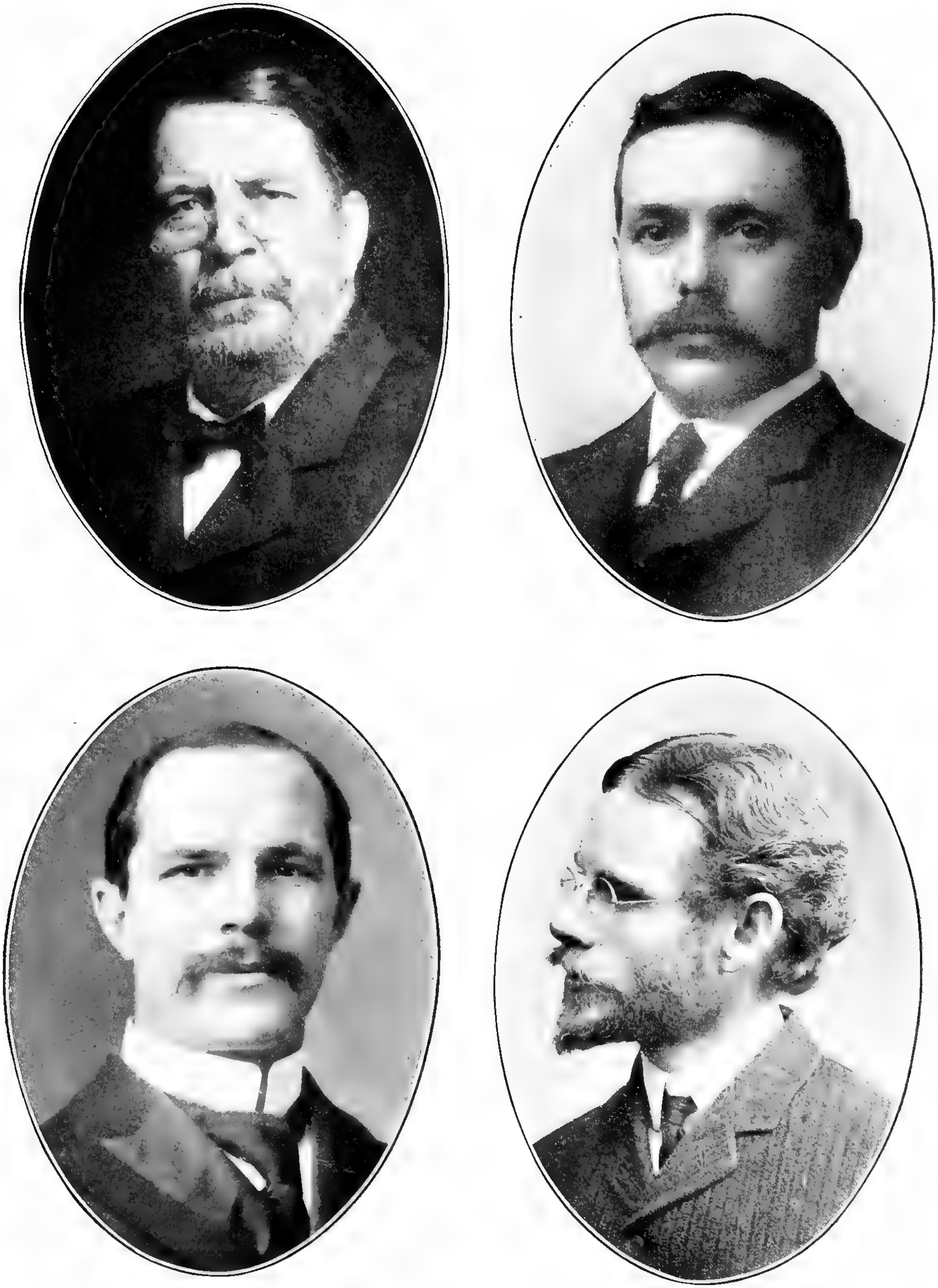
The department of mathematics was first organized by Professor Evan Wilhelm Evans, who remained at its head until a few months before his death in 1874. He was born in Wales in 1827, and came at an early age to this country. In 1851 he was graduated with high distinction at Yale, where he became an instructor in mathematics. He was a professor in Marietta College, Ohio, when invited by President White to the senior chair in the Cornell faculty. He has been described by his colleague and successor, Professor Oliver, as " a man of few words, but of a remarkably sound and independent judgment that carried great weight in the faculty councils, and as an acute and thorough student, a philosophical and original thinker, a firm and loyal friend. . . . Characteristic of his instruction or policy were: the remarkable power of concentration with which he would follow others' work without using his eyes, his uniform preference for oral above written examinations, and his habit of taking a calculus class over the same ground with two successive authors for the sake of the cross-light." His lectures had a peculiar finish and precision, those on modern synthetic geometry being especially beautiful.

During the six years of his work at Cornell, Professor Evans was ably seconded by the following assistant professors: Ziba H. Potter (1868-82); Major William E. Arnold (1869-76); Henry T. Eddy, A. B., Yale '67, Ph. D., Cornell (1869-73), now professor in the University of Minnesota; Lieutenant William J. Hamilton

(1869-70), died 1872; Lucien Augustus Wait, A. B., Harvard '70 (1870-77); James E. Oliver, A. B., Harvard '49, A. M. (1871-74); William E. Byerly, A. B. Harvard '71, Ph. D. (1873-76), now professor in Harvard University. In addition, Mr. O. H. P. Cornell, C. E., '74, acted as instructor during the year 1870-71.

Professor Oliver became head of the department in 1874, but after 1877 the executive work was shared with Professor Wait, who in that year was advanced to an associate professorship, and to a full professorship in 1891. Professor Oliver was born in Salem, Mass., of Quaker parentage, in 1829. He was the poet of the class of '49 at Harvard, and the favorite pupil of Professor Benjamin Pierce, who always declared that " Jimmy Oliver was the best mathematician who had ever come under his notice." As a teacher, Professor Oliver was thorough, painstaking, considerate, and, above all, inspiring by his wealth of suggestiveness and depth of intellectual insight. His methods in the classroom were very informal, and he seldom lost an opportunity of making a good joke, even when the joke was on himself. As he was happiest when the text-book could be laid aside and he could follow his own bent, it is possible that he did not always attain the best results with a miscellaneous class of undergraduates; but with " audience fit though few," he was wont to open up new vistas, sometimes forgetting the lapse of time in his enthusiasm. His publications are not numerous, for the drudgery of working up an article for permanent form was peculiarly irksome to him, especially after the freshness of discovery had passed away; and, during his best years, he had small leisure for writing, as he had then comparatively few assistants, and his recitation hours sometimes amounted to more than twenty in the week. His high original power was of the kind that shows itself not so much in published writings as in familiar classroom talks, and in the inspiration which they impart to others; and it is thus he would wish his name to live. As regards the silent influence of his life, there must be many hundreds of students and others who still derive inspiration from the memory of his high standards, and the rare beauty of his life and character with its unusual freedom from self-consciousness.

In the first few years of Professor Oliver's administration, in addition to Assistant Professors Wait, Potter, Arnold, and Byerly, the following three persons acted temporarily as instructors without regular appointment: George T. Winton, B. L., '74, afterwards president of the University of North Carolina, and then president of the University of Texas, now president of the Mechanical College, Raleigh, N. C.; Madison M. Garver, B. S., '76, now at State College, Pa.; Morris R. Conable, B. C. E., '76, M. S., '88. Between 1876 and the death of Professor Oliver in 1895, the following appointments were made: Charles A. Van Velzer, B. S., '76, instructor (1876-77), now professor in University of Wisconsin; George W. Jones, A. B., Yale, '59, A. M., assistant professor (1877-93), associate professor (1893-95), professor since 1895; James McMahon, A. B., Dublin, '81, A. M., instructor (1884-90), assistant professor (1890-1904), professor 1904; Arthur S. Hathaway, B. S., '79, afterwards fellow at Johns Hopkins, instructor (1885-90), assistant professor (1890-91), now professor in Rose Polytechnic Institute, Terre Haute, Ind.; Duane Studley, B. S., '81, instructor (1887-92), afterwards professor in Wabash College, now professor in Normal School, Chicago; George E. Fisher, A. B., '87, instructor (1887-89), now assistant professor in University of Pennsylvania; Charles S. Fowler, A. B., '88, instructor (1889-95), now chief examiner to Civil Service Commission, Al-



MATHEMATICS

George William Jones
Virgil Snyder

John Henry Tanner
John Irwin Hutchinson

bany, N. Y.; Walker G. Rappleye, B. S., '82, instructor (1889-94), now professor in Normal School, Oswego, N. Y.; John H. Tanner, B. S., '91, instructor (1892-94), student at Goettingen (1894-96), assistant professor (1894-1904), professor 1904; Paul L. Saurel, B. S., New York City College, post-graduate at Cornell (1890-91), fellow (1891-92), instructor (1892-96), Ph. D., Bordeaux, '99, now instructor in New York City College; William R. Shoemaker, B. S., Iowa State College, post-graduate at Cornell (1890-92), instructor (1892-94); Daniel A. Murray, A. B., Dalhousie, Ph. D., Johns Hopkins, instructor (1894-1902), now professor in Dalhousie College; Joseph Allen, A. M., Harvard, instructor (1894-97), now instructor in New York City College; John I. Hutchinson, A. B., Bates College, Ph. D., Chicago, instructor (1894-1903), assistant professor since 1903.

On the death of Professor Oliver, in March, 1895, Professor Wait became head of the department, having for the previous eighteen years borne a large part in its management. Under him the following new appointments have been made: Ernst Ritter, Ph. D., Goettingen, appointed assistant professor in May, 1895, a distinguished young German mathematician who died of typhoid fever on his way to this country, September 22, 1895; Virgil Snyder, A. M., Iowa State College, post-graduate at Cornell (1890-92), travelling fellow (1892-1893), Ph. D., Goettingen, 1895, instructor (1895-1903), assistant professor since 1903; George A. Miller, A. B., Muhlenburg College, Ph. D., instructor (1897-1901), now associate professor in Stanford University; William B. Fite, Ph. B., '92, Ph. D., '01, instructor since 1901; Henry F. Stecker, Ph. D., Wisconsin, instructor (1901-03), now instructor in State College, Pa.; Harry W. Kuhn, B. S., Ohio State University, '97, graduate scholar at Cornell (1898-99), fellow

(1899-1900), assistant (1900-01, Ph. D., '01, now assistant professor in Ohio State University; Henry L. Rietz, B. S., Ohio State University, '99, graduate scholar at Cornell (1899-1900), fellow (1900-01), assistant (1901-02), Ph. D., '02, now assistant professor in University of Illinois; John W. Young, Ph. B., Ohio State University, '99, graduate scholar (1900-01), fellow (1901-02), assistant (1902-03), Ph. D., '03, now assistant professor in Northwestern University; Clarence L. E. Moore, B. Sc., Ohio State University, '01, graduate scholar (1901-02), fellow (1902-03), assistant (1903-04), Ph. D., '04, now instructor in Massachusetts Institute of Technology; Frank C. Edminster, A. B., '02, assistant, 1903; Charles N. Haskins, B. S., Massachusetts Institute of Technology, Ph. D., Harvard, instructor, 1904; Oscar P. Akers, A. B., University of Colorado, '98, A. M., '00, graduate scholar at Cornell (1902-04), assistant, 1904.

As seen by the dates given above, the staff now consists of four professors, two assistant professors, two instructors, and two assistants.

In June, 1900, Professor Wait completed thirty years of service in the university faculty; and his mathematical colleagues, in recognition of that event, wrote him the following letter: "We, your co-workers in the department over which you preside, take occasion on the close of your thirtieth year as a Cornell professor of mathematics, to express our high sense of the services you have rendered to the cause of education and sound learning. As a small token of our warm regard, based on your personal qualities and unfailing courtesy and kindness, we ask you to accept the accompanying purse, suggesting that you use it this summer, when in Europe, to purchase whatever may seem most fitting to associate with this occasion."

In the summer of 1902 Professor Jones completed twenty-five years of service in the faculty, and was presented with a valuable chair by his colleagues in the department in token of their high estimate of his work and character.

After this account of the teaching force of the department it may be well to sketch in brief outline the gradual changes in the mathematical requirements for the various courses of study in the university, and then to conclude with a statement of the general aims and ideals of the department.

At first the only mathematical subjects required for entrance were arithmetic and algebra up to quadratics, the latter topic being, however, included after two or three years. Students of all courses were then required to study algebra, plane geometry, and solid geometry in the freshman year, and trigonometry in the first part of the sophomore year. Students in mechanical engineering, civil engineering, and architecture took in addition analytic geometry (one or two terms), calculus (three terms), and synthetic geometry (one term). Analytic geometry was also a required study in the course in philosophy until 1885, and was for some years an alternative subject in the course in history and political science. In the latter course the theory of probabilities and statistics was for many years a required study. Astronomy was required in the course in science, and was an alternative study in the course in philosophy. By degrees during the first decade the entrance requirements of the various courses were changed so as to include plane geometry; thus the three subjects of arithmetic, algebra through quadratics, and plane geometry became " primary entrance requirements " in all courses; this left the freshman year free for the three more advanced subjects of solid geometry, algebra, and trigonometry required in all courses. In 1896 the entrance examination in arithmetic was abolished on the understanding that the examinations in geometry and algebra should contain numerical problems, and include questions on the metric system of weights and measures. This was one of the results of the conference of representatives from the leading eastern universities, looking towards uniform entrance requirements. During the decade 1888-98, the entrance requirements in the architectural and the two engineering courses were gradually raised so that the subjects of solid geometry, algebra, and trigonometry were transferred from the freshman list to the entrance list, thus making room for more of the strictly professional work in these three technical courses. Students in these courses now take analytic geometry and differential and integral calculus in the freshman year; synthetic (or projective) geometry is no longer a required study, the ground being partly covered by the work in descriptive geometry given by the department of civil engineering, but technical students are encouraged to take a short elective course in differential equations to follow the work in calculus. In 1898, on the unification of the non-technical courses into one course in arts and sciences, and the more complete application of the elective system to that course, all the mathematical work in the university became elective except the analytic geometry and calculus for freshmen in the architectural and two engineering courses. In this required work alone there are at present over five hundred students taught in fifteen sections five hours a week; this is about equal to the entire number of students in all mathematical courses fifteen years ago.

The subjects already mentioned constitute what may be called the " old college curriculum " in pure mathematics. In addition, there has always been elective work in the more advanced parts of these subjects for students of special aptitude. There has also been for many years a well-organized system of graduate studies in all the great modern fields, such as invariant-theory, function-theory, group-theory, etc. Moreover, the department has always regarded mathematical physics as an organic part of mathematical discipline, for the student's outlook is enlarged by the physical concepts and interpretations involved, he is furnished with illustrative material, and he is led to recognize the wonderful harmony between the world of nature and the world of the pure intellect. These elective courses bring the numbers up to nearly seven hundred, necessitating an average of nearly fifteen hours a week of classroom work for the various teachers, besides the time required for reading examination papers, and preparing for lectures and recitations.

As may be seen from the lists given above, a number of the instructors have been selected from the ranks of the graduate students. Many well-qualified graduates have been attracted by the annual fellowship founded in 1884, and by the two graduate scholarships, the first of which was founded in 1894, and the second in 1896, the latter being known as the Oliver Memorial Scholarship, due to the gift of a friend and pupil of Professor Oliver. A number of important graduating theses for doctorates, written under faculty direction, have been published in leading mathematical journals. In addition to such direction and the arduous work of instruction, most of the members of the teaching force are themselves regular contributors to the journals. The following text-books have also been written by members of the department: Oliver, Wait and Jones' *Trigonometry and Algebra;* Jones' *Drill Books on Algebra and Trigonometry, and Trigonometric Tables;* Tanner and Allen's *Analytic Geometry;* McMahon and Snyder's *Differential Calculus;* Murray's *Integral Calculus;* Snyder and Hutchinson's *Calculus;* Murray's *Differential Equations;* Tanner's *Elementary Algebra;* McMahon's *Elementary Geometry.*

For purposes of research the facilities furnished by the university library are hardly surpassed by those of any other mathematical collection in America. There are several thousand books on pure and applied mathematics, besides complete sets of most of the chief American and European journals. A steady growth is assured by the Sage library fund, so that in time the collection of mathematical classics and sources will have become reasonably complete, thus facilitating kinds of work that were impossible in the university's earlier days. Moreover, the department is equipped with over three hundred well-selected models of curves, surfaces, crystals, and polyhedra, illustrating various problems in geometry and analysis, and in the higher theory of functions.

In conclusion, the general aim and spirit which runs through all the work of the department cannot be better described than in the following words of Professor Oliver, who did so much to form its ideals: "The work of the department to-day, like the earlier work out of which it has grown, contemplates three general uses: 1. To help the average student in developing certain powers and habits which every good citizen and good thinker requires, namely, of sustained, exact, candid, independent reasoning even when the subject-matter is general or abstract; of conscientiously scrutinizing a plausible argument, both in detail and in its general course; of imagination, to grasp as a whole a complex concept or scheme of thought; of inventiveness as to methods and possible relations; of applying theory to practical problems; of precision and clearness in stating one's own convictions and the grounds of them. 2. For those who wish to make pure and applied mathematics a specialty, to give some outlook over its different fields; and to fit these students for teaching, or for home reading and investigation, or for study at European universities. 3. To meet the needs of students in various branches of engineeering, physics, and sociology.

" The endeavor is not usually to cover all the ground in a given field, but to master the fundamental difficulties of concept and method, and secure whatever peculiar culture this implies—relying more upon insight and origination than upon memory, and making all necessary memory-work as philosophical as may be. Attention is also given to the criticism of methods and their motives, methods suggested by general considerations being preferred; to the concrete interpretation of important steps as well as of results; and to the separation of symbols and their laws from the particular subject-matter, so that either may be studied separately. Whether instruction be given by textbooks with recitations and problem-working, by written exercises and examinations, or by lecture, seminary and directed reading, the class are regarded rather as the teacher's fellow-students than as mere recipients of instruction. . . . The number taking the various electives as undergraduate, graduate, or special students has about kept pace with the general growth of the university; though the splendidly equipped technical courses on the one hand and the admirable scientific and humanistic work done here on the other hand, offer strong counter attractions. For, in the community at large, mathematics is still thought of merely as a good logical drill, and a key to the physical sciences, with their applications. One great mission of the mathematical department here, as elsewhere, is to show that in healthily developing the geometric and philosophic imagination, in awakening an intelligent interest in the grand systems of worlds amid which our own is placed, as well as a sense of the beauty of purely intellectual relations, in adding definiteness to certain metaphysical concepts; and in that correlation of the abstract with the concrete and with the certain which will help to cure the prevalent distrust of ideals, mathematical studies have peculiar educational and even religious values that could ill be spared.''

A Brief History of the Department of Physics in Cornell University, 1867 to 1904

The first professor of physics at Cornell University was Eli Whitney Blake, who was appointed shortly after the opening of the university in 1867. Mr. Blake was a graduate of Yale (1857). He subsequently studied in the Sheffield Scientific School, and later in Germany, where he spent three and one-half years under Bunsen and Kirchoff at Heidelberg, Kolbe at Marburg, and Dove and Magnus at Berlin. At the time of beginning his work in Ithaca he had had two years' experience, having been professor of physics in the University of Vermont (1866-67), and acting professor of physics in Columbia College (1868-69). After one year at Cornell Professor Blake was appointed to the Hazard professorship at Brown University (1870), which post he occupied up to the time of his death in 1895. Professor Blake was a man of strong mechanical tastes and tendencies, and fond of experimental work. He published little, but one of his papers, on the photography of sound vibrations, attracted wide attention in the scientific world. It still stands as the pioneer attempt in the development of a method which has since been found of great value. It was impossible in the single year in which he held the chair of physics to make more than a beginning. The department had yet no settled quarters and no equipment.

The place left vacant by his resignation was filled by the appointment of John Jackson Brown, A. M., later of the University of Syracuse.

He was succeeded, nominally at least, in 1871 by Francis Englesbee Loomis, Ph. D., a son of Professor Elias Loomis of Yale College, who resigned the appointment before entering upon his duties on account of ill health.

In the year following (1872) William Arnold Anthony was appointed professor of physics and, as his title first ran, of the industrial arts. Professor Anthony was born at Coventry, R. I. He was prepared for Brown University at the Friends' Boarding School at Providence, and at the Academy at East Greenwich. His taste for the sciences showed itself early, and while still at school he assisted in the preparation of lecture experiments in physics and chemistry. To obtain better opportunities for scientific and technical study he left Brown and entered the Sheffield Scientific School in New Haven, from which institution he was graduated in 1856 with the degree of Ph. B. After graduation he was successively a teacher in a graded school, science master in an academy, professor of physics and chemistry in Antioch College, Ohio, and professor of physics at the Iowa State Agricultural College. From the last-named institution he came to Cornell.

With the advent of Professor Anthony the development of the department of physics, which up to that time had neither had quarters nor equipment, began. The impression made by him upon his classes was immediate and profound. Upon his first appearance in the lecture room newly assigned to physics, in the south wing of the then just completed McGraw Hall, he was recognized as a master. His ability as a lecturer and his extraordinary skill as an experimenter commanded the admiration of his classes, and before he had been on his feet ten minutes in the delivery of his first lecture he had gained a hold upon the student-body which increased as time went on, and which continued to grow throughout his long career as head of the department.

Preparations for practical work in physics were begun at once, and in spite of the inadequate quarters assigned to the department, consisting of the cellar under the lecture room and of a small room behind the lecture-room seats, an equipment unique in its thoroughly practical character was rapidly built up. The department soon outgrew its cramped quarters, and, upon the completion of White Hall, rooms in that building were temporarily put into service as physical laboratories.

In one of his students, George Sylvanus Moler, who was a member of the first class in physics which came under his teaching, Professor Anthony found a kindred spirit and an invaluable assistant, who, even during his undergraduate days, devoted much of his time to the designing and construction of apparatus. At the hands of these two men, each of whom possessed a veritable gift for practical mechanics and the ingenuity and enthusiasm necessary to the successful inventor, the development of the department proceeded along highly original lines, and apparatus for the illustration of the principles of the science was rapidly accumulated.

The following illustration of the activity and the progressive spirit which prevailed in the department may be cited. When, in 1874, Gramme, the inventor of the first successful type of dynamo machine for direct currents, exhibited his apparatus in Paris, Pro-

DEPARTMENT OF PHYSICS

George Sylvanus Moler
Ernest Merritt

Edward Leamington Nichols
Frederick Bedell

fessor Anthony and Mr. Moler proceeded to the construction of a similar machine. This dynamo, which was in successful operation before any Gramme dynamo had been imported into this country, was a thorough success, and it was put into service in a variety of ways. An electrolytic generator for the production of hydrogen and oxygen gas, together with tanks for the storage of the same, were erected in the basement of McGraw Hall, and gas for use with projecting lanterns was thus manufactured. In 1875 two arc lights were erected on the campus, one of which was placed in the tower of the chapel. From this point it was visible for many miles around, exciting the curiosity and wonder of the inhabitants. The writer well remembers the description given by a venerable farmer who, from his remote home on Saxon Hill, some twelve miles distant from Ithaca, could look over to the hillside now occupied by the university buildings, of his astonishment when these two brilliant lights first made their appearance in the night. At that time even Paris and London were without permanent electric street lighting. Trials and exhibitions had been made in both cities, but the Cornell campus was probably the first locality provided with a permanent installation of arc lamps.

This Gramme machine was exhibited at the Centennial Exhibition in Philadelphia, where it attracted much attention, and it is, after nearly thirty years, still in working order and a valued item of the equipment of the department.

In 1876, the year after his graduation, Mr. Moler was appointed instructor in physics. In 1880 he was promoted to an assistant professorship. For ten years Professor Anthony and he formed the entire teaching force of the rapidly growing department. In spite of the intense activity and enthusiasm which imbued both the head of the department and his coworker during this interval, but few results reached the stage of publication. It was a case of research for its own sake, and it seems scarcely to have occurred to the experimenters that what interested themselves intensely was of also sufficient interest to warrant publication. This was unfortunate, inasmuch as the reputation of the department was spread chiefly by means of the personal impression made upon individual students.

The attention of the department was turned at an early day to the subject of applied electricity, and in 1881 Professor Anthony succeeded in persuading the Board of Trustees to announce a course in electrical engineering. This, being a technical subject, was placed nominally in the curriculum of Sibley College, although for many years the professional work of engineering students, so far as it was electrical in its nature, remained altogether in the hands of the department of physics.

In 1883 the university began the construction of Franklin Hall for the joint accommodation of the departments of chemistry and physics. The former department had for many years been housed in a temporary wooden structure opposite White Hall. In planning this building, which was completed in 1884, provision was made for the accommodation of eighty students in laboratory courses in physics and twice that number in the lecture room. It was thought that the size of the laboratory would be ample for all time.

In 1884 Professor Anthony secured a special grant for the purchase and construction of apparatus for absolute measurements in electricity. A small wooden building entirely free from iron was erected on the west of Sibley College and in it were placed what was probably the most complete and accurate set of instruments for the measurement of the electric current at that time in existence. The most notable piece of apparatus in this equipment was the great tangent galvanometer invented by Professor Anthony and constructed by Fred Clarkson Fowler, who had in that year been appointed instrument-maker to the department. This was a colossal instrument with coils two meters in diameter and capable of measuring currents up to 250 amperes with a precision hitherto unattained.

In 1884, likewise, the system of university fellowships and graduate scholarships was instituted. The valuable results obtained from these endowments, so far as the department of physics is concerned, may be gathered from a study of the list of fellows in physics and electrical engineering during the first ten years (1884-1894). The first fellow named by the department was James Gilbert White, who is now the head of one of the most important engineering firms in the United States. In the following year Dugald Caleb Jackson was fellow in electrical engineering and Benjamin Warner Snow of physics. They are now the heads of the departments of electrical engineering and physics in the University of Wisconsin. Then came in succession Ernest Merritt, now professor of physics in Cornell University, Samuel J. Saunders, now professor of physics in Hamilton College, Frederick Bedell, now assistant professor of physics in Cornell University, Ernest Fox Nichols, now professor of physics in Columbia University, Ervin S. Ferry, now professor of physics at Purdue University, Frank E. Millis, subsequently professor of physics in Lawrence University, and Robert W. Quick, who at the time of his premature death was professor of physics in the Georgia Polytechnic Institute. The total number of fellows and scholars nominated by the department during this decade was fourteen, and it will be seen from those just mentioned that no less than eleven amply fulfilled their early promise by subsequent attainments.

In 1887 Professor Anthony, whose leanings had always been strongly towards the practical side, resigned his chair to enter the profession of electrical engineering, and Edward Leamington Nichols, a member of the first class which came under his instruction at Cornell in 1873, succeeded him.

Mr. Nichols, who was graduated at Cornell with the class of 1875, had conceived so great a fondness for the study of physics under the inspiring teaching of Professor Anthony that he decided immediately after graduation to go to Europe for further study of this science. After nearly four years at Leipsic, Berlin, and Goettingen, much of which time was spent in the laboratory of Helmholtz, he received the degree of Doctor of Philosophy at the last-named institution. On his return home in 1879 he was fellow in physics for a year in the Johns Hopkins University. The following year (1880-81) was devoted to problems relating to the development of the incandescent lamp in Edison's establishment at Menlo Park. For two years (1881-83) he was professor of physics and chemistry in Central University, Richmond, Ky., and for the four succeeding years (1883-87) professor of physics and astronomy in the University of Kansas.

In August, 1887, Mr. Nichols was appointed to the chair of physics in Cornell University, made vacant by Professor Anthony's resignation. At that time, although the university had already entered upon its period of rapid growth, the number of students in the university having increased from 461 in 1884, the date of the completion of Franklin Hall, to 1,010 in 1887-88, the teaching force of the department of physics consisted of the professor and one assistant professor. The work both in physics and chemistry was, however, growing by leaps and bounds with the development of the technical colleges. One instructor in physics was appointed in 1887, two in 1888, three in 1889, four in 1890, etc. Among these early instructors in the department were Harris Joseph Ryan, who subsequently became professor of electrical engineering in Sibley College, and Ernest Merritt, who in 1892 was promoted to an assistant professorship and in 1903 became full professor in this department. It soon became impossible to accommodate the classes in both sciences in Franklin Hall. Temporary relief was had by the building of a one-story annex to the north of the main building, and subsequently, in 1891, the new chemical laboratory, Morse Hall, was completed, and the department of physics was given sole possession of Franklin Hall and of the old chemical annex. The roof of the latter building was raised, and it was remodeled and equipped to serve as a laboratory for work with dynamo electric machinery and in applied electricity.

In 1893, Frederick Bedell, who had entered the department from Yale as a graduate student and had already held a fellowship and an instructorship, was appointed to an assistant professorship.

In 1893, the *Physical Review*, a journal devoted to experimental and theoretical physics, was founded, and arrangements were made with the Macmillan Company to act as publishers for the university. The *Review* was supported by annual appropriations made by the Board of Trustees, and was edited by Professors Nichols, Merritt, and Bedell. Although the new journal was maintained by the university and edited by a local board, it was hoped to make it the representative and recognized journal of physics in America. This position it speedily attained, formal recognition of which fact was secured by the co-operation of the

American Physical Society in 1903. During the first four years the *Review* appeared bi-monthly, six numbers constituting the annual volume. After 1896 it has been published every month, making two volumes a year. During the first ten years of its existence the *Physical Review* printed, in addition to numerous contributions from without, 168 papers, dealing with experimental and theoretical investigations, written by members of the teaching force and by graduate students in the department of physics.

In the spring of 1904, twenty years after the completion of Franklin Hall, contracts were let for a new physical laboratory, to be erected at a cost of $250,000. This step had become necessary by the growth of the department, which in 1903-04 had an enrollment of considerably over 1,000 students and a teaching force consisting of two full professors, four assistant professors, and ten instructors and assistants, and a material equipment exclusive of buildings inventoried at $87,990.05. The Rockefeller Hall of Physics,[1] as the new physical laboratory was named, in honor of John D. Rockefeller, who gave the money and its equipment, has three stories above the basement. It is to be constructed of stone to the level of the first floor, and with red brick above with a tile roof. It consists of a south wing 160 × 72 ft., a north wing parallel to the same 146 × 53 ft., running east and west on the south side of Reservoir Avenue, and a connecting structure 133 ft. in length and 57 ft. wide parallel to East Avenue. Behind the north wing is the dynamo laboratory, a one-story structure 60 ft. wide and 190 ft. long, from east to west.

In the court behind the building there will be a low, flat-roofed structure, mostly underground, for the

[1] See the *Alumni News*, January 13, 1904, from which the following paragraphs are taken.

ROCKEFELLER HALL

accommodation of the heating and ventilating plant, and also of storage batteries and of the apparatus for the generation and storage of oxygen, hydrogen, and acetylene gas.

The first floor of the south wing is to contain a suite of seven recitation rooms and a small lecture room to accommodate about 100 hearers; also cloak and toilet rooms for men and women. In the second story of this wing is the large physical lecture room, 70 × 72 ft., and seating a class of about 600, and a smaller lecture room of approximately the size of the present lecture room in Franklin Hall. Between these are located apparatus and preparation rooms for the storage of such instruments as are chiefly used for demonstration purposes. The third floor of this wing contains a large apparatus room, and at the west end two large rooms with adjacent dark-rooms in which are to be mounted respectively the large Rowland diffraction grating of 21 ft. focus, and smaller diffraction gratings. This large diffraction grating has been in the possession of the department for some years, but has never been mounted for lack of a suitable room. It is intended for work of the highest precision in the study of solar and other spectra, and will become a valuable addition to the equipment of the department. The attic of the south wing, which is lighted from the roof, is set aside for the storage of such portions of the large collection of apparatus belonging to the department as cannot be accommodated on the other floors.

The central portion of the building, which connects the north and south wings, contains on the first floor departmental offices, director's room, and laboratory, the library, periodical room, and computing room, an editorial office for the *Physical Review,* and a stenographer's office. The second floor is to be devoted to the sophomore laboratory work. It will contain a large laboratory room on the west, a suite of small rooms for special work on the east, a library and computing room and office, and an apparatus room. The third floor of this portion of the building contains rooms set aside for advanced work in light and in photography, an apparatus room for optical instruments, and a museum. In this museum apparatus which is no longer of use, but which may possess historical interest, is to be placed; here also will be preserved special forms of apparatus which have been used in research work in the department and which are of interest in connection with that work.

The first floor of the north wing contains the alternating current laboratory, a lecture room for applied electricity, with adjacent office and a suite of rooms for the standardization of electrical apparatus and for various lines of special work in electricity. The second floor of this wing contains the junior laboratory consisting of one large general laboratory room and suites of small rooms for photometry, spectroscopic work, etc. The offices and apparatus room are situated at the junction of this wing with the central portion of the building, so as to be adjacent to those of the sophomore laboratory. These two laboratories are on the same floor, and so arranged as to be conveniently administered from a common center. The same reference library and computing room is to be used by both classes. The third floor of the north wing is devoted to the photographic laboratory, which contains, in addition to the numerous dark-rooms necessary to this work, an exposing-room with skylight on the north, a weighing-room, rooms for printing by daylight and by artificial light, rooms for the washing of plates, and a room with lantern for the inspection and testing of lantern slides.

The dynamo laboratory, which is adjacent to the north wing, extends to the east, and contains offices and apparatus rooms and a large machinery floor 100 × 60 ft. The basement under the offices at the west end is to contain a students' workshop and a locker room. The ground under the remainder of the dynamo laboratory is unexcavated, the floor upon which the machinery is to be placed being on a substantial grouting of cement.

The basement under the three main portions of Rockefeller Hall has been set aside primarily for research work in physics. It is well lighted on every side, and having a floor placed directly upon a massive foundation of cement will give the stability essential for the most refined operations. It is believed that no physical laboratory in this country will afford such complete facilities for physical investigation. In addition to the numerous research rooms there is in this basement a special machinery hall for the accommodation of the apparatus for the production of liquid air, for various compressing and vacuum pumps, and for the numerous forms of special machinery necessary to modern work in physics. It is hoped to install at an early day apparatus for the liquefaction of hydrogen. In the basement under the south wing, in addition to the suites of research rooms, are to be located the instrument-makers' shop, the workshop for advanced students, a special room for chemical manipulations, and a suite of rooms specially constructed for work in which constant temperatures are necessary. An elevator in this wing will connect all floors from basement to roof, making it possible to transfer apparatus from floor to floor.

The new laboratory will have two main entrances on the west, one on the south giving access from that direction to recitation rooms and lecture rooms, and one on the north from Reservoir Avenue leading to the alternating current laboratory and the dynamo laboratories.

The elevations submitted by the architects show a building of simple but of pleasing and dignified appearance, well-proportioned, and harmonious in design. As to its internal arrangements, it is felt that the laboratory will be superior to anything of the sort thus far constructed in this country.

The department of physics has contributed the following list of publications to the advancement of science: Edward Leamington Nichols, *The Galvanometer,* 1894; *A Laboratory Manual of Physics and Applied Electricity,* two volumes, 1895 (with Professors Merritt, Bedell, and others); *The Elements of Physics,* three volumes (with Professor W. S. Franklin), 1896; *Outlines of Physics,* 1897. Frederick Bedell: *Alternating Currents* (with C. Crehore), 1895; *The Principles of the Transformer,* 1896.

The Department of Chemistry

The department of chemistry was one of the first in which an appointment was made. At the sixth meeting of the Board of Trustees, held September 26, 1867, four professors were elected, among them Dr. George C. Caldwell as professor of agricultural chemistry, and James M. Crafts as professor of general chemistry. Professor Caldwell was a graduate of the University of Göttingen, had studied the methods of instruction in the model college of Cirencester, England, and was widely known for his investigations in agricultural chemistry. Professor Crafts was a graduate of the Lawrence Scientific School, and had afterwards spent several years in study in France and Germany, where he had published several original investigations of great merit. At the time of his appointment he was an instructor in the Lawrence Scientific School. He made subsequently many brilliant investigations, which caused him to rank among the most eminent of American chemists; he was later a professor and acting president of the Massachusetts Institute of Technology. Soon after the appointment of these professors of chemistry they prepared lists of the most important English, French, and German standard works in their department and of the leading chemical periodicals, which were purchased by the university abroad through President White, and formed a portion of the equipment at the opening of the university. Many complete sets of chemical journals were also obtained, thus constituting a valuable library for investigation from the beginning. Chemical apparatus was ordered, and arrived from Europe in the summer of 1868. The boxes which contained these scientific treasures were stored and opened in the northwest basement of what is now known as Morrill Hall. Professor Caldwell presents a graphic account of a professor's life in those early days. At that time he occupied a house partially completed near the head of Buffalo Street. "To reach the university it was necessary to climb a hill without sidewalks; to skirt Cascadilla, passing an old weather-stained mill which stood behind it, and avoid skilfully the débris around these buildings; to descend into a gorge by ladders, and to risk one's life in crossing planks; to wind through the woods upon the north bank, and then pass through fields and over two successive ravines, and clamber over fences before the solitary building which constituted the university was reached. The new professor found his earliest task in the manual labor of unpacking these European purchases. The first chemical laboratory was established in the basement of Morrill Hall, in the large room on the north side of the central entrance. The private laboratory of Professor Crafts, for his own and for the special work of his students, consisted simply of one short table at the end of this room, with a shelf and two capacious drawers below. Professor Caldwell's laboratory consisted of a similar table at the other end of the room. All the water supply was brought in pails, and the waste received and carried out in jars. The only ventilation was through chimney flues, and what did not escape through this uninviting exit ascended to the library room, which was directly above. Lectures in agricultural chemistry were given in a small basement room adjoining this laboratory, and the lectures on general chemistry in the large room on the other side of the middle hallway." Thus these pioneers of education passed through hardships, the immortal humor of which is now their chief compensation. "During the fall and winter a large wooden building was erected near the middle of what was then the campus, and in the spring vacation the chemical department forsook its narrow and uncomfortable quarters in Morrill Hall for its new rooms in this wooden structure, and I have no doubt that those who were left behind were as glad to have us leave as we were to get away. Of room we had an abundance in our new quarters, but of comfort not so much. It was expected that we might occupy them for four or five years, and, of course, with such expectations, the building was cheaply constructed and all its discomforts were endured for ten years or more, instead of the limited time originally anticipated. The building was at first occupied by the departments of mechanical engineering, botany, and physics, as well as chemistry. One by one these departments were transferred to better quarters, until finally it became the exclusive possession of the chemical department for a few years. Then the department of civil engineering moved into it, and was in its turn left its sole occupant, when the chemical department moved into the second and third stories of Franklin Hall, where, for the first time, it was accommodated in quarters especially planned and constructed for its use (1882)."

Professor James M. Crafts resigned at the end of the first year, and Professor Charles A. Schaeffer was elected professor of analytical chemistry and mineralogy, June 30, 1869. Professor Schaeffer was a graduate of the University of Pennsylvania, and also of the University of Göttingen, Germany. He remained connected with the department until his election as president of the University of Iowa in 1887. During the year 1886-87 he acted as dean. In 1870 Professor Chester H. Wing was elected to the chair of chemistry as applied to manufactures. Professor Wing had graduated with distinguished honor at the Lawrence Scientific School, and had also had practical experience as a manufacturing chemist. He was connected with the university from January, 1870, to 1873, and he delivered subsequently each year until 1880 a series of lectures upon organic chemistry. After leaving this university he was appointed to a professorship in the Massachusetts Institute of Technology, where, through his efforts, one of the largest departments for instruction in chemistry in the country was created. A. A. Breneman was appointed assistant professor of industrial chemistry in 1875, and professor in 1879, which position he held until 1882. Professor Breneman made many interesting investigations during his connection with the university, and later, as consulting chemist in New York, valuable discoveries of colors available for use in the manufacture of pottery. Dr. Spencer Baird Newberry, a graduate of the School of Mines, and later a student in the University of Berlin, was made assistant professor of general chemistry, mineralogy, and assaying in 1882, and acting professor of organic and applied chemistry (1886), and of general organic and applied chemistry (1887), which position he filled until 1892. Professor Newberry was an enthusiastic student of his chosen branch and took great pleasure in the development of chemistry as applied to photography. At the Exposition in Paris of 1889 he was appointed by the United States government to make the report upon certain branches of chemistry, and later he was a representative of the state of Ohio, and judge in the Chicago Exposition of 1893.

The scope of instruction in chemistry was greatly widened. At first, only general, analytical, and agricultural chemistry were taught, and laboratory practice was confined to analytical chemistry. A short time after the department was established in Franklin Hall, laboratory practice in general chemistry was introduced, suggested by the evident usefulness of such practice for a better understanding of the principles of elementary general chemistry, and also on account of the option of chemical laboratory practice, which was allowed for a few years in place of a part of the mathematics, which had hitherto been required in the general courses. Some kind of work in general chemistry seemed to be far more appropriate for this option than the more technical work of analytical chemistry. The inequality of the option of work in elementary chemistry for mathematics soon became so evident that it was given up after a very brief trial, but laboratory work in general chemistry has been continued up to the present time. Technical chemistry was also added to the course of instruction, but was discontinued after two or three years on account of the resignation of the professor who first suggested its introduction and taught it. Organic chemistry was taught by lectures, and laboratory practice added later, together with metallurgical chemistry. Later additions to the field of instruction in chemistry consisted of courses in technical and engineering analysis, spectroscopic chemical analysis, gas analysis, the coal-tar dyestuffs, stereochemistry, physiological chemistry, the history of chemistry, advanced inorganic chemistry, advanced physical chemistry, mathematical chemistry, electrochemistry, physical chemistry for engineers, foods and beverages, potable water, toxicology, micro-chemical analysis, and the micro-chemical examination of foods.

There is probably no other department, except perhaps that of physics, the growth of which is so intimately associated with the expansion of the technical courses and the courses in natural history and in medicine. As these departments grow, new demands have always been made upon that of chemistry. The lowest period in the history of the university, and perhaps the most discouraging, was that which preceded the erection of Franklin Hall, which was occupied in 1882. In a single term of the year 1881-82, the number of registered students fell to three hundred and twelve. From this period the growth of the university has been uniform and marked. The first step in reorganization was the introduction of laboratory work in connection with Professor Schaeffer's course in general chemistry. To accommodate the instruction in laboratory work, in introductory inorganic chemistry, and in organic chemistry, an annex to Franklin Hall was authorized. The work in assaying was also housed in this annex. It was thus possible to transfer the assaying laboratory from Franklin Hall, where it had been an element of danger from fire, to the new building, and also make a much-needed addition to the laboratory of qualitative analysis. The increased prosperity and the enlarged revenues at this time (1886) made it possible to make considerable purchases of minerals. At the same time the department of mineralogy was transferred to that of geology, the instruction of which was assumed by

Instructor, later Assistant Professor, James Furman Kemp, whose title became that of assistant professor of geology and mineralogy.

Upon the resignation of Professor Schaeffer, Dr. Newberry assumed his work, with the efficient assistance of Dr. W. R. Orndorff, later assistant professor of general and organic chemistry (1890-93), of organic chemistry alone (1893-1903), and professor of organic and physiological chemistry since 1903. Dr. Orndorff had especial charge of work in the laboratory for organic chemistry, and acted as assistant also in inorganic chemistry and in blow-pipe analysis.

At the same time, Mr. Louis M. Dennis, a graduate of the University of Michigan (1885), a graduate student in chemistry during the following year, was appointed instructor in chemistry (1887-89), assistant professor of analytical chemistry (1891-94), associate professor or inorganic and analytical chemistry (1894-1900), professor of inorganic and analytical chemistry (1900-02); in the latter year he was placed in charge of the department. He was made professor of inorganic chemistry and head of the department in 1903. In 1887 Mr. Dennis assisted in the introductory laboratory practice in inorganic chemistry, and during the winter term lectured on metallurgy.

The same year a liberal appropriation was made for a chemical museum. Meantime, however, the demands upon the department had increased with great rapidity. From the number of students registered in the year 1881-82, 384, the attendance had reached 832 at the close of the academic year of 1886-87, and in the following year had reached 1,022. The accommodations, which had been ample a few years earlier, became greatly restricted. The lecture rooms were so small that lectures in organic chemistry had to be repeated in order to accommodate the number of students. On October

CHEMISTRY

Louis Monroe Dennis
William Ridgely Orndorff

Joseph Ellis Trevor
Emile Monnin Chamot

24, 1888, the trustees voted an appropriation of $80,000 for the erection of a new building for the department of chemistry, subsequently called Morse Hall. The erection of this building was begun in July, 1889, and was completed so that it could be opened for use in September, 1890. The new chemical building is 180 feet long and 70 feet wide, of two stories, with a high basement and a large sub-basement, and contains 40 rooms. No building erected upon the university grounds combines perhaps so many admirable features in lighting and arrangement as this. It contains two lecture rooms, one seating 358, and the other 77 students. On the first floor there is the main office of the department, the supply room, a laboratory for quantitative analysis, with 163 working places, the department library, a laboratory of advanced agricultural chemistry, a laboratory of soil investigation, and a laboratory for micro-chemical analysis. On the second floor, in addition to the large lecture room, there is the laboratory for introductory inorganic chemistry with 337 places, laboratory for physiological chemistry, together with smaller rooms and offices. In the basement are located the laboratory of qualitative analysis with 263 working places, organic chemistry with 48 places, advanced organic chemistry, chemical bacteriology, incubator room, and smaller rooms and offices.

When this building was first erected, a course in pharmacy was introduced (1888), and Mr. William Angell Viall was placed in charge. Mr. Viall remained connected with the university as instructor in pharmacy and lecturer in materia medica until the School of Pharmacy was abolished by the trustees in 1890.

It was supposed that the building erected in 1890 would meet the needs of the department for many years to come, but the rapid increase in the number of students, and the development of new lines of instruction, soon demanded additional accommodations, and an addition to Morse Hall was consequently erected in 1898. This addition is 130 feet long and 65 feet wide and is connected with the main building by corridors. It was designed primarily to accommodate the work in advanced inorganic chemistry and in physical chemistry, but recently the laboratory of the Agricultural Experiment Station, and office and private laboratory of the assistant professor of agricultural chemistry, have been transferred to this building. The addition is five stories high, including a sub-basement. In this sub-basement are located the main ventilating chambers, storage rooms for chemicals, constant temperature room, power rooms, workshop, and ore storage room. In the basement proper there are laboratories for gas analysis, assaying, bullion assay, sanitary chemistry, and combustion analysis, together with a fireproof room for work with inflammable substances, and an electric furnace room. On the first floor there are a lecture room, seating 65 students, the chemical museum, the laboratories for spectroscopic chemical analysis, and for advanced inorganic chemistry, together with special laboratories and offices. On the second floor there are another lecture room seating 65, the laboratories of physical chemistry and electro-chemistry, the laboratory of the Agricultural Experiment Station, and several private laboratories and offices.

The expansion in the work of instruction has been met by considerable additions to the staff. Dr. Joseph Ellis Trevor was appointed assistant professor of physical chemistry in 1892, and in 1900 he was made professor of general and physical chemistry. In 1903 his title was changed to professor of physical chemistry. Professor Trevor had been a student in Cornell University from 1888 to 1890. He then studied in Germany, receiving the degree of Doctor of Philosophy at the University of Leipzig in 1892.

Dr. Wilder Dwight Bancroft graduated at Harvard in 1888, where he also pursued advanced studies, specializing in chemistry, more particularly in physical chemistry. He later studied at Amsterdam and Leipzig. He was an assistant at Harvard (1893-94), instructor (1894-95). He was appointed assistant professor of physical chemistry at Cornell in 1895, and in 1903 he was made full professor.

Dr. Emile Monnin Chamot graduated at Cornell in 1891, and was instructor in chemistry (1891-1901). In 1901 he was made assistant professor.

Assistant Professor George Walter Cavanaugh graduated at Cornell with the degree of bachelor of science in 1896. He was assistant chemist in the Experiment Station from 1896 to 1903, when he was appointed assistant professor of chemistry in its relations to agriculture.

The department of chemistry now ranks as one of the great departments of the university. It gives instruction annually to over 1,000 students, offers 55 separate courses in chemistry, and has a teaching staff of 26. The department is now offering within the College of Arts and Sciences a four years' course in chemistry for those intending to specialize in chemistry with the object of fitting themselves for positions in teaching, or in technical practice. The registration in this special course is at present (1904) 103.

Professor Caldwell's courses were mainly in agricultural chemistry, but included also quantitative methods, chemical philosophy, the use of the polariscope and refractometer in analysis, sanitary chemistry, the chemistry of food and beverages, and physiological chemistry. With the growth of the department many of these subjects have become special branches and been assigned to an independent chair.

Professor Dennis's courses have been introductory and advanced courses in organic chemistry, with laboratory practice, also technical qualitative and quantitative gas analysis, spectroscopic chemical analysis, and colorimetry.

Professor Orndorff gives elementary and advanced courses in organic chemistry, and special courses of lectures upon coal-tar dyestuffs, stereochemistry, and physiological chemistry.

Professor Trevor lectures upon mathematical chemistry.

Professor Bancroft gives courses in electro-chemistry and advanced physical chemistry.

Professor Chamot gives lectures upon foods and beverages, the chemistry of potable water and other beverages, toxicology, food and water analysis, micro-chemical methods and analysis, and the microscopic examinations of foods.

Professor Cavanaugh gives courses in general and advanced agricultural chemistry, agricultural analysis, and dairy chemistry.

Professor Caldwell resigned in 1902. His connection with the department had continued from the opening of the university. A silent man, conscientious in duty, alert to new applications of his favorite subject, he had acted as head of the department since the resignation of Professor Schaeffer.

The department aims primarily in its instruction to give the students a thorough grounding in all the principal branches of chemistry, and to that end specialists in these several branches have from time to time been added to the staff. It is not the policy of the department to emphasize the practical working of industrial chemical processes, but rather to acquaint the students with the underlying theory in the several branches. The success of this plan is attested both by the large number of graduate students carrying on advanced work in the department (24 in 1904), and also by the marked success in teaching and in industrial work of those who have gone forth from the department.

Botany

The botanical department was organized at the opening of the university in October, 1868. Professor Albert N. Prentiss, then a professor in the Michigan Agricultural College, from which institution he graduated in 1861, was elected head of the department, and placed in charge of botany, horticulture, and agriculture. During the first few years the work was carried on under very great difficulties, owing to the lack of suitable rooms, apparatus, and illustrative material. The rooms occupied temporarily by the department during this period were in Morrill Hall and in the wooden laboratory building in the center of the campus (long since removed), and finally in Sibley College from 1871 to 1875. Here the opportunities for carrying on the instruction were considerably improved, owing to the fact that all the work of the department was under one roof. The accumulation of collections of plants in the region of Ithaca and of plants and forest products in Brazil, and with the purchase of models, made it possible to more satisfactorily illustrate the lectures.

The general elementary course of instruction was given entirely by lectures, and this method was continued down to 1896, when the head of the department became emeritus professor. Professor Prentiss had the rare gift of an easy, fluent, and illuminating style in his lectures, which always attracted large numbers of students to this general elementary course, the number in the class ranging from 100 to 175. From the first, however, an advanced course of lectures on systematic botany was given, and an effort was made to interest the students in this course, as well as the beginning students, in the study of the local flora. In 1873 the work of the department was further broadened by the introduction of a course of lectures on the fungi, and the mycological work of the department may be said to date from Professor Prentiss's interest at this time in that subject.

The flora in the vicinity of Ithaca is exceptionally rich and varied. This early period was marked by especial enthusiasm on the part of certain students in explorations and discoveries of the rarer plants of the region. Among these students might be mentioned Dr. David Starr Jordan, now president of Leland Stanford Jr. University; Dr. J. C. Branner, and Professor William R. Dudley, the former now a professor of geology, and the latter now a professor of botany, also in Leland Stanford Jr. University; W. A. Kellerman and W. R. Lazenby, the former now a professor of botany, and the latter professor of horticulture in the University of Ohio.

In 1872 an instructor in botany was appointed for the first time. The first year this place was held by D. S. Jordan, then a senior student. The following year W. R. Dudley, then a junior student, was appointed to the position.

During this period two important accessions were made to the museum equipment of the department. The first and most important acquisition was a collection of herbarium specimens made by Horace Mann, Jr., who had been a student and herbarium assistant of Dr. Asa Gray. This collection was purchased in 1869 by President Andrew D. White, at a cost of $1,014, and presented to the university. There were upward of

7,500 mounted species, many of them represented by more than one specimen. The collection consisted mainly of flowering plants and ferns, and is especially rich in plants from the Sandwich Islands.

During the summer and autumn of 1870 Professor Prentiss was absent in Brazil with the Cornell Exploring Expedition. This expedition was organized by Professor C. F. Hartt for the purpose of making studies and collections in natural history. The party, made up of the two professors named and about ten students, sailed from New York the latter part of June, and returned early in the following January. The principal explorations were made in the valley of the Amazon for a distance of some 400 miles above Pará, and on two of the chief tributaries of the main stream, the rivers Xingú and Tapajós. The advantages of this expedition to the botanical department consisted chiefly in the opportunity for the professor of botany to make an extended field study of tropical vegetation, and a considerable collection of material for the herbarium and museum.

In the fall of 1875 the department began its work in its present quarters, in the south wing of Sage College. In view of the growth of the department, and its at present inadequate quarters, the following description, prepared by Professor Prentiss for the History of Cornell University in 1893, is of interest. "The corner-stone of this building had been laid with appropriate ceremonies on May 15, 1873, and the building was now ready for use. The rooms occupied by the department were a large lecture room, a professor's office and study, and a laboratory on the first floor; a museum 28 × 46 feet on the second floor, and on the third floor a number of smaller rooms used for pressing and mounting specimens for the herbarium, storage for duplicates and apparatus, and other similar uses. The total floor area thus occupied by the department was upwards of 6,000 square feet. The lecture room was handsomely finished in hard wood and provided with fixed seats with walnut arm-rests for 156 students. By the use of chairs, the seating capacity of the room could be somewhat increased without undue crowding. The enrollment of some of the larger classes has been upwards of 175. The laboratory was lighted from the north, and adapted to microscopical as well as general laboratory work. In the museum were the general herbarium and other collections, for which suitable cases had been provided. Thus, after six years of pioneering, with inadequate but slowly improving facilities and the temporary occupancy of various buildings, the department found itself located in handsome quarters admirably adapted to its requirements.''

Beginning with the fall of 1875, Mr. W. R. Dudley was regularly appointed instructor in botany to devote his entire attention to the subject, the previous appointments having been for a single term each year. At the beginning of the following year (1876-77) he was appointed assistant professor. The scope of instruction was now somewhat increased, chiefly in dealing with the lower plants. In the spring of 1877 a course of instruction was given on mosses and algæ, and in the following autumn on ferns, and instruction in these subjects has continued to the present time. Opportunities for special work were improved, and an increasing number of students were now conducting work of this kind.

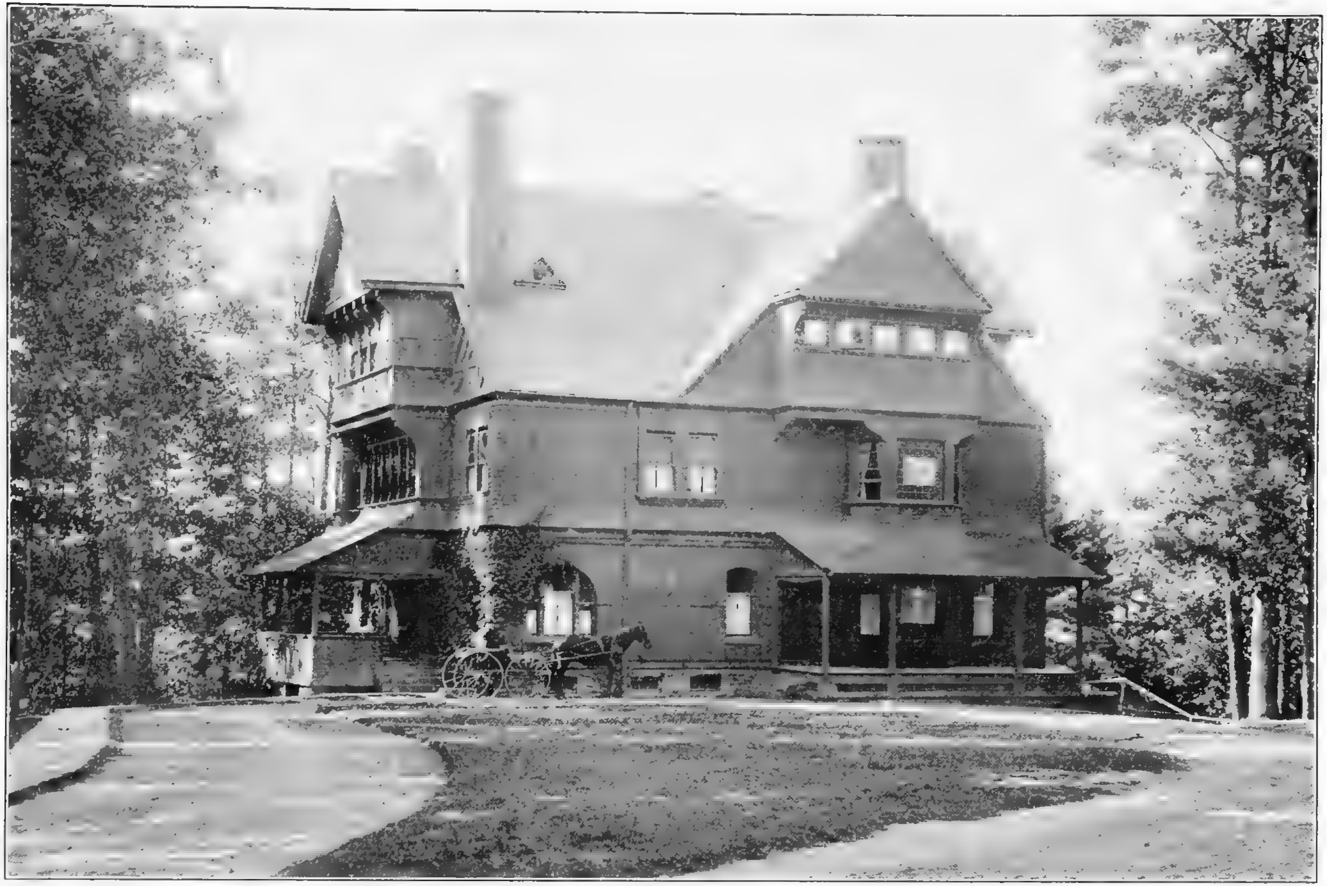
Within five years of the first occupancy of Sage College the facilities for laboratory work had become inadequate for want of room, and the need of a greenhouse, from which living plants could be obtained at all seasons of the year, was felt to be urgent. At this juncture the Hon. Henry W. Sage, who had already made princely gifts to the university, offered as a further gift the means for extending the laboratory and erecting a conservatory, the whole to cost $15,000. Work was begun in the summer of 1881. The laboratory extension was of brick, 24 × 36 feet, two stories in height, and corresponded in architecture to the older building. The conservatory consisted of five connected glass structures, of different heights and adapted to different temperatures, the whole range being in extreme dimensions 50 × 152 feet. These improvements were completed in the following spring, and were formally opened by appropriate exercises held in the botanical lecture room on the evening of June 15, 1882. Brief addresses were made by President White, Hon. Erastus Brooks, and others.

These increased facilities for botanical work were of great moment. The available space in the phanerogamic and histological laboratory (on the first floor) was nearly doubled, and an office and study for the assistant professor of botany was provided. On the second floor was a well-lighted laboratory, devoted for several years wholly to the study of the lower plants. The conservatories, which were built in the most substantial manner, proved to be admirably adapted to the uses for which they were intended, and soon began to afford material for work and illustration in all the courses of instruction offered by the department as well as by affording opportunities for experimental work and investigations on the physiology of plants. In the fall of 1882 Mr. Robert Shore was appointed head gardener, and placed in immediate charge of the conservatories.

In 1886 the catalogue of the flowering plants of Ithaca and vicinity was published by Professor Dudley under the title, *The Cayuga Flora.* This important book was based upon the studies and explorations of the officers and students of the department from the beginning of the university, this being supplemented by special and critical work carried on for several years by the author. The field embraced in this flora is the territory drained by Cayuga Lake and its tributaries, of which Ithaca is approximately the center. The number of species and varieties catalogued was 1,278. The catalogue proper forms a pamphlet of 140 pages, with two maps, and is preceded by an introduction of some thirty pages. The catalogue has been of great service to the department as a guide to explorations and field study; and the thoroughness of the work is shown by the fact that, although the field studies have continued to the present time with unabated interest, only a small number of species have been added to those listed in the flora.

For the year 1887-88 Mr. F. V. Coville was appointed instructor in botany, Professor Dudley being in Europe. Mr. Coville graduated at the Commencement of 1887, and had been a student of marked ability in botany throughout his university course.

In the summer of 1888, the Agricultural Experiment Station, provided for by the act of Congress known as the Hatch Act, was established at the university. After due consideration the Station Council decided that some botanical investigations concerning the diseases of plants, especially those of fungous origin, ought to be undertaken in the interest of the station. This work was placed in the hands of Professor Dudley at his request, and the duties of cryptogamic botanist to the station were assigned to him in the fall of 1888. To secure time for these new duties Professor Dudley was relieved of all work of instruction for one term, and a part of the work for the other two terms of the year. In connection with these changes, Mr. W. W. Rowlee,



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who had graduated at the previous Commencement, was appointed instructor in botany.

The evidences of improvement and increased interest in botanical work during this period were encouraging. The actual as well as the relative number of students engaged in special work, and in research and investigation of a more or less difficult nature, was greater than ever before.

A change of importance was made in the general course. Heretofore this course of three lectures per week had been given in the spring term. Beginning with 1890-91 the course was given in the fall and winter terms, two lectures per week being given. This change nearly doubled the time assigned to the general course, and was important especially in this, that it made it possible to devote the entire winter term to a course of lectures on the physiology of plants.

At the close of the collegiate year 1891-92 Professor Dudley retired from the university in order to accept a professorship of botany in the Leland Stanford Jr. University. Professor Dudley was animated by high ideals in scientific work, and took advantage of every opportunity to encourage his pupils to do thorough and careful work and to interest them in research. His interest was as great in the investigations in progress by his pupils as in his own problems of study, and a great deal of his life and interest while at Cornell was given to his students.

At the beginning of this year (1892) Professor Geo. F. Atkinson was appointed assistant (and since associate) professor of cryptogamic botany in the university, and cryptogamic botanist to the Experiment Station. Professor Atkinson graduated from Cornell in 1885, and had occupied the chair of entomology and general zoölogy in the University of North Carolina (1885-88), and the chair of botany and zoölogy in the

University of South Carolina (1888-89), but at the time of his appointment was professor of biology in the Alabama Polytechnic Institute, and the Agricultural College of Alabama. His chief line of work had been in cryptogamic botany, and his investigations and contributions, especially in fungi and in fungous diseases of plants, had become widely and favorably known. His familiarity with the subject, and a very considerable increase in laboratory equipment, now rendered it possible to add to the courses already established an important course on the methods of study and culture of fungi and bacteria.

During the winter of 1896 the health of Professor Prentiss, which had gradually been failing for several years, became so poor that he asked to be relieved from further active participation in the administration of the department. At the winter meeting of the Board of Trustees he was appointed professor emeritus. He died in the next summer. The following from an appreciative article[1] on the life of Professor Prentiss will explain why it is that his productiveness in botanical research was not great, though by his peculiar influence and encouragement he was the means of stimulating his students to original investigation.

" Professor Prentiss's writings upon botanical subjects have been few. In 1871 he wrote an essay on the ' Mode of the natural distribution of plants over the surface of the earth,' which received the first Walker prize by the Boston Society of Natural History, and was published in pamphlet form (University Press, Ithaca, N. Y., 1872). Minor contributions have also been made to some of the American botanical journals.

" The fact that his productiveness has not manifested itself in more frequent and pretentious contributions upon botanical topics may have seemed surprising to those who have not understood the conditions under which Professor Prentiss has labored. During the early history of the university the organization of a department when funds were not sufficient to at once build and equip suitable rooms for the large number of students, the exacting duties as superintendent of the grounds for the larger part of his connection with the university, where constant personal supervision was necessary in connection with the improvement and care of fifty to one hundred acres, was sufficient, with the duties as teacher, for a number of years without any assistance, to prevent the planning and carrying out of any extended investigations. During the later years failing health, while it did not prevent him from attendance upon the duties of instruction and administration of his office, did not leave him sufficient reserved strength for the close and continued application necessary in conducting extended experiments or prolonged research. Punctilious to a fault in meeting his appointments, he rarely missed any of his classes, even when suffering from an indisposition which would have warranted an occasional respite. But during the last two years illness had at several times compelled him to give up all work for short periods, though he would return to work again when convalescent, and in such a state of health which would have constrained others to absent themselves longer from duty. But in the winter of 1896 he found it necessary, in order that his health might be cared for, to ask to be relieved from further active participation in the administration of the department.

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[1] Albert Nelson Prentiss, *Botanical Gazette*, 21, 283-289, pl. 19, 1886.

"At the winter meeting of the Board of Trustees he was elected professor emeritus in recognition of his long and faithful services to the university, and the faculty attested by appropriate resolutions the esteem in which he has always been held by his colleagues, and the value of his services and influence in the early history of the university, when it required men of strong faith and firm principles to stand up for the new and advanced ideals upon which Cornell University was founded.''

At the same winter meeting of the Board of Trustees Professor George F. Atkinson was appointed to the head of the department and made professor of botany, with special reference to comparative morphology and mycology, and Mr. W. W. Rowlee was promoted to an assistant professorship of botany, with special reference to comparative histology and systematic botany. In June, 1896, further appointments were made as follows: E. J. Durand (D. Sc. 1896), assistant, was promoted to be an instructor in botany, and K. M. Wiegand (B. S. 1894) was reappointed assistant in botany. Dr. Durand has continued as instructor to the present time, and Dr. Wiegand (D. Sc. 1898) was promoted to an instructorship in botany in 1899, and the appointment has continued to the present.

In 1898, owing to the constant increase in the number of students both in the elementary and advanced courses, two graduate assistantships in botany were established. To these are appointed graduate students, who are on half-salary, devoting one-half their time to instruction and the remainder to investigation and study. The object in founding these assistantships was threefold—to secure their services in instruction and assistance, to give opportunity to worthy graduates to secure higher education, and to enable them to acquire experience in teaching and in the conduct of laboratory work. This is of great importance in fitting them to take places of responsibility as instructors or professors elsewhere. In the following year a third graduate assistantship was established.

A number of these graduate assistants, including all those first appointed, have since been elected to responsible positions in universities, colleges, experiment stations, government work, or in the higher grades of schools.

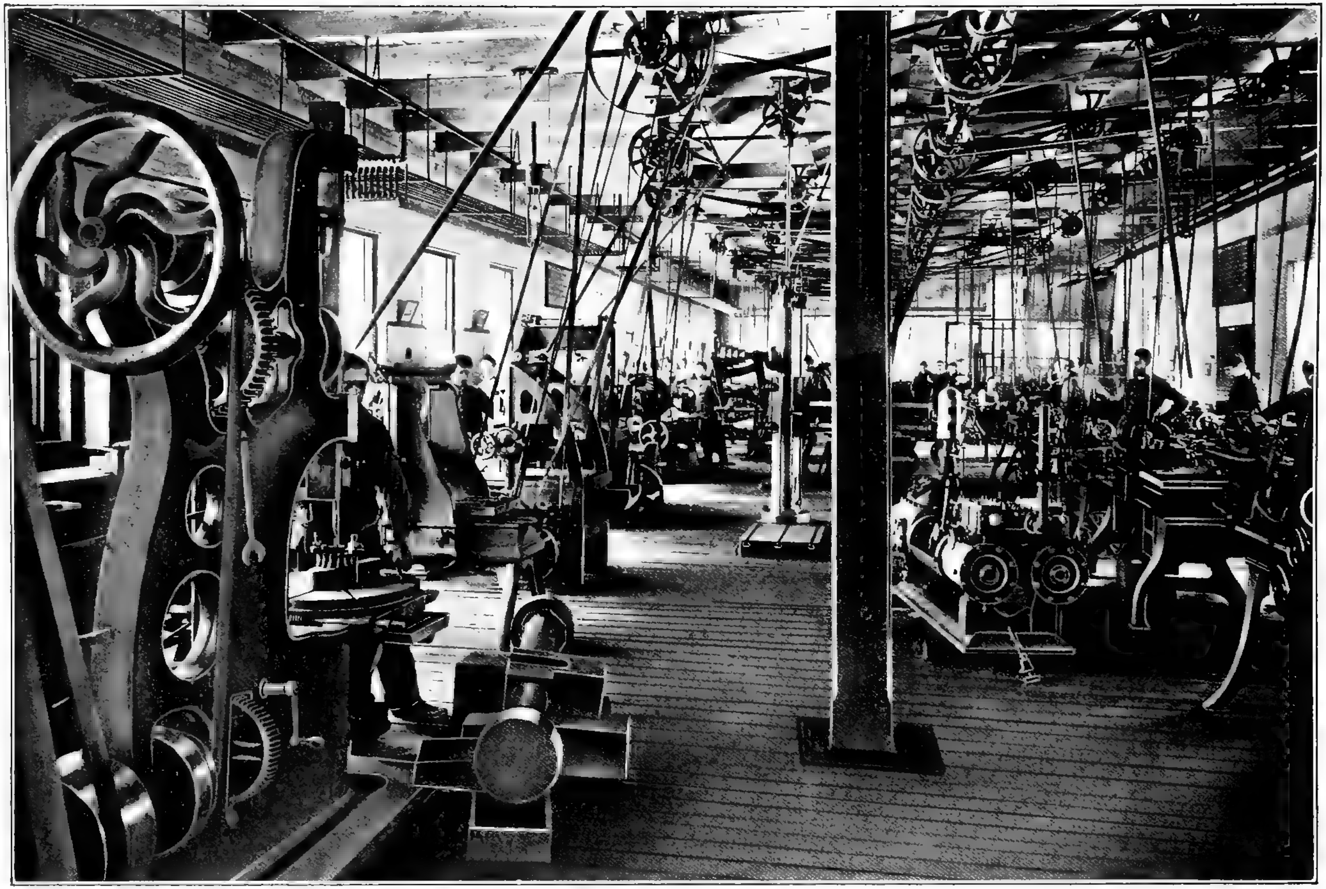
In 1898 the instruction was further broadened by the appointment of Dr. B. M. Duggar (Cornell, Ph. D. 1898) as instructor in botany, with special reference to plant physiology, a subject of great and growing importance. Dr. Duggar had been for two years connected with the department in the capacity of assistant cryptogamic botanist of the Experiment Station. Dr. Duggar was formerly a graduate of the Mississippi Agricultural College, then of the Alabama Polytechnic Institute, and later a Bachelor and Master of Arts of Harvard University. He had acted as assistant in the Agricultural Experiment Station of the University of Illinois before being called to the botanical division of the Cornell University Agricultural Experiment Station. His appointment as instructor in charge of plant physiology did not remove him from the Experiment Station work, but enabled him to devote a portion of his time to an advanced course of instruction in plant physiology. Dr. Duggar's call to government work in the Bureau of Plant Industry at Washington in 1900, from where he was soon called to be head of the botanical department of the University of Missouri, made it necessary for the time to place the work in plant physiology temporarily in charge of an assistant.

The plan of instruction has three different aims: first, general and fundamental; second, advanced instruction and preparation for research, and third, original research. Under the first head are offered the general courses, embracing general comparative morphology and physiology of plants, with studies of the life processes of plants, and studies of representative plants in the great groups. Practical laboratory work in addition to lectures was introduced in this elementary course for the first time in the year 1896-97 on the reorganization of the department at that time, and has been attended with excellent results. This is followed by a course in the spring on the special morphology and relationship of flowering plants and, in addition, a general course on geographic botany. These general courses are intended not only to prepare the student for advanced work, but to afford an opportunity for the general student, or the specialist in other branches, to become familiar with the fundamental principles of botanical science. Under the second head are comprised advanced courses in comparative morphology and embryology, comparative histology, mycology, taxonomy, physiology, cytology, geographic botany, and ecology. Besides the special principles, historical treatment, facts of structure, development, and relationships, which are emphasized in the lectures, the practical laboratory work is so arranged as to give the student knowledge at first hand, and, at the same time, to give him practice in methods of research. These general and advanced courses are designed to prepare students for teaching in the higher grades of secondary and normal schools, and to prepare them for the important work of original research. Under this, the third head (original research), some problem is assigned to the student in the solution of which he is left largely to his own resources for the purpose of acquiring the power of independent investigation. At the same time the work is under the special supervision of some officer of the department with whom the student consults, and who offers advice and suggestions while keeping in touch with the progress of the work. The success of the student in research work, combined with his preparation in the general and advanced courses, fits him for the graver responsibilities in teaching and research in the higher institutions of learning, or for experimentation and research in government or state work.

While the department is hampered because of the smallness of its present quarters, and sadly needs a new building to be devoted entirely to botanical purposes, there are, however, fine opportunities for research. The equipment in apparatus for investigation in morphology, embryology, mycology, physiology, cytology, histology, etc., is exceptionally good with microscopes, microtomes, ovens, incubators, sterilizers, electrical apparatus, culture rooms, etc. In addition there is a good and growing herbarium, a greenhouse with a good assortment of exotics, and an exceptional local flora.

The results of research by officers and students are shown in the large number of original contributions to science emanating from the laboratories of the department. Professor Atkinson has published important papers in physiology, on the œdematous diseases of plants; in morphology, on the transformation of fertile to sterile leaves among ferns, development and structure of fresh-water algæ; on qualitative reduction in plants; in mycology by numerous original contributions to the development and taxonomy of fungi, as well as others on fungous diseases of plants, besides books on the biology and development of ferns, on mushrooms, and several text-books of botany. Professor Rowlee has published contributions to the histology of plants, and geographic botany. Dr. Durand has contributed a number of articles on fungi, especially on the discomycetes, and has gained merited distinction among co-workers in this branch of mycology. Dr. Wiegand has made contributions to the subject of embryology and especially to taxonomy, in which field he has shown distinguished talent. Dr. Duggar while connected with the department was active in research, and won distinction especially for his investigations on the fungous diseases of plants. Among the graduate students, the most notable pieces of research work are those by Dr. Margaret C. Ferguson (now associate professor of botany in Wellesley College) on the embryology and development of pines; by Dr. K. Miyake (now a member of a commission from the Japanese government to Europe) on the development and embryology of certain spruces; by Dr. J. F. Clark (for a time assistant professor of forestry in Cornell university and now in the work of forestry of the Canadian government) on the effect of certain chemical substances on the germination of fungus spores; by Dr. Bertha Stoneman (now professor of botany in the University of South Africa, Huguenot College, Wellington, Cape Colony) on a group of fungi known as anthracnoses; by W. A. Murrill (now assistant curator in the New York Botanic Garden) on the embryology of the hemlock spruce, and by C. S. Sager (professor in the State Normal College, Albany) on the *Asclepias,* development of the pollinium and sperm cells in *Asclepias.* A list of the more important contributions showing the range and character of subjects investigated is contained in the Appendix.

The herbarium had its beginning in the collections made by the early students and in the purchase of the Horace Mann herbarium by President Andrew D. White mentioned above. It has had a steady growth by additions made by the officers and students of the department and by purchase. At present there are about 90,000 specimens. This is made up of local plants (chiefly flowering plants and fungi), a large collection of exotics, chiefly ferns and flowering plants from the



MACHINE SHOP, SIBLEY COLLEGE

Hawaiian Islands, a good representation of western and southern flowering plants, exsiccati of fungi, algæ, lichens, a special collection of Chilian plants made by Mr. G. T. Hastings, a collection of plants from the Isle of Pines by Professor W. W. Rowlee, and a special collection of European fungi made by Professor George F. Atkinson in 1903.

The Summer School in the university had its beginning in a private enterprise on the part of various professors and instructors. The botanical work in the Summer School was begun by Professor Rowlee in 1892, who continued this work until 1898, when Professor Atkinson took charge of it for one year as a private venture. In 1899 the university organized the Summer School, and Professor Atkinson was appointed professor of botany and has continued the work until the present. The work in the Summer School is voluntary on the part of the professors. Courses are offered in general botany for teachers, as well as in advanced and research work. The botanical work has always attracted a number of investigators during the summer, and has drawn a number of graduate students to the university.

The establishment of the Agricultural Experiment Station at the university in 1888, mentioned above, provided for investigations into the nature of diseases of plants. A botanical division was organized and Professor Dudley was appointed cryptogamic botanist. This position he held until his withdrawal from the university, in 1892. Professor Atkinson then became cryptogamic botanist. In 1896, on the reorganization of the department, while the work of the division remained practically as heretofore, Professor Atkinson was made botanist of the Station. The demands on the time of the botanist were so great, an assistant was provided by the appointment of Mr. B.

M. Duggar (see above) as assistant cryptogamic botanist. This was made possible by the state appropriation to the Cornell University Agricultural Experiment Station known as the Nixon Fund. During 1899, while Dr. Duggar was on leave in Europe, Mr. W. A. Murrill, a graduate student, was appointed in his place. On Dr. Duggar's withdrawal in 1901 Mr. C. O. Smith (now mycologist of Delaware Agricultural Experiment Station and instructor in botany), a graduate student, was appointed on half-time, and was succeeded the following year by Messrs. J. M. Van Hook and H. H. Whetzel, both graduate students, on half-time. These appointments continued for two years, when Mr. Van Hook withdrew to accept the position of plant pathologist of the Ohio Agricultural Experiment Station. Mr. Whetzel was then appointed plant pathologist of the botanical division on full time. While the primary object of the work of the botanical division has been the study of the fungous diseases of plants, the natural result has been that physiological diseases of plants have been investigated as well. Many weeds and grasses are also sent to the botanist for determination. In addition to investigation into the nature of plant diseases, considerable work has been done by the botanist in the study of mushrooms and the determination of the edible and poisonous species. Two bulletins were published dealing with this subject. For a list of the more important subjects investigated by the staff of the botanical division see the bulletins of the Cornell University Agricultural Experiment Station in the list of papers by officers and students of the department above.

Following is a list of graduates who have carried on research work in the botanical department and now occupy prominent positions: Atkinson, G. F. (Ph. B. 1885), Professor of Botany, Cornell University;

Arthur, J. C. (Ph. D.), Professor of Vegetable Physiology, Purdue University; Ashe, W. W., Botanist to the Geological Survey of North Carolina; Bodine, D. (A. B. 1887, D. Sc. 1895), Professor of Zoölogy, Wabash College, Indiana; Bray, Wm., Professor of Botany, University of Texas; Carss, Elizabeth (Ph. B. 1895), Instructor in Botany and Nature Study in Horace Mann Training School, New York; Clark, J. F. (Ph. D. 1901), Provincial Forester in charge of Crown Lands of Ontario, and Head of the Forestry School at Toronto University; Cordelay, A. B., Professor of Biology, and Biologist of the Oregon Agricultural Experiment Station; Craig, Moses, Professor of Botany in the Oregon Agricultural College in 1899; Coville, F. V. (B. S. 1887), Botanist of the Bureau of Plant Industry of the United States Department of Agriculture; Densmore, H. D., Professor of Botany, Beloit College; Dudley, William R. (B. Sc. 1874), Professor of Botany, Leland Stanford Jr. University; Duggar, B. M. (Ph. D. 1898), Professor of Botany, University of Missouri; Durand, E. J. (A. B. 1893, D. Sc. 1895), Instructor in Botany, Cornell University; Ferguson, Margaret C. (B. S. 1899, Ph. D. 1901), Associate Professor of Botany, Wellesley College; Gager, C. S. (Ph. D. 1900), Professor in the State Normal School, Albany, Special Assistant New York Botanic Garden; Gregory,[1] Emily L., Professor of Botany, Barnard College; Hastings, G. T. (B. S. 1898), Professor of Natural History, Winona Military Academy; Herrick, G. W. (B. S. 1896), Professor of Biology, Mississippi Agricultural College; Hough, R. B. (1881), author of *American Woods;* Kellerman, W. A. (B. Sc. 1874), Professor of Botany, Ohio State University; Kennedy, P. B. (Ph. D. 1899), Professor in Botany, Nevada State University; Lazenby, W. R. (B. Sc. 1874), Professor of Horticulture, Ohio University; Mathews, C. W. (B. Sc. 1891), Professor of Horticulture and Botany, State College of Kentucky; Moore, V. A., (B. Sc. 1887), Professor of Comparative and Veterinary Pathology and Bacteriology, Cornell University; Millspaugh, C. F., Botanist to the Chicago Columbian Museum; Murrill, W. A. (Ph. D. 1901), Assistant Curator of the mycological herbarium, New York Botanical Garden, Bronx Park, New York City; Needham, J. G. (Ph. D. 1898), Professor of Biology, Lake Forest College; Peirson, Mabel B., Miss (B. Sc. 1900), Professor of Botany, Girls' Collegiate School, Los Angeles, Cal.; Pettit, R. H. (B. S. 1894), Entomologist of the Michigan Agricultural Experiment Station; Riley, W. W. (Ph. D. 1903), Instructor in Entomology, Cornell University; Rowlee, W. W. (B. L. 1888, D. Sc. 1893), Assistant Professor of Botany, Cornell University; von Schrenk, H. (B. S. in Agr. 1893), Pathologist in charge of Mississippi Valley Laboratory for Bureau of Plant Industry, United States Department of Agriculture; Snow, Julia W. (B. Sc. 1888), Instructor in Botany, Smith College, Massachusetts; Stewart, F. C., Botanist of the New York Agricultural Experiment Station, Geneva, N. Y.; Stoneman, Bertha (Ph. B. 1894, D. Sc. 1896), Professor of Botany, Huguenot College of the University of South Africa, Cape Colony; Thom, C., Mycologist for Dairy Division, United States Department of Agriculture (located at Storrs, Conn.); Thomas, M. B. (B. Sc. 1890), Professor of Botany, Wabash College; Trelease, W. (B. Sc. 1880), Professor of Botany, Washington University, and Director of the Missouri Botanic Garden; Van Hook, J. M., Plant Pathologist of the Ohio Agricultural Experimental Station, Wooster; Whetzel, H. H., Assistant Plant Pathologist, Cornell University Agricultural Experimental Station; Wiegand, K. M. (B. S. 1894, Ph. D. 1898), Instructor in

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[1] Deceased.

Botany, Cornell University; Yatabe,[1] R. (1876), Professor of Botany and Curator of the Botanic Gardens, University of Tokio.

The Department of Entomology

Although it was not till the fifteenth year of the active work of the university (the year 1882-83) that a full professorship was assigned to this department, the establishment of a department of entomology was part of the original plan of organization of the university. In the first general announcement of the university there is given a list of seventeen professors who had been elected, and the titles of nine others who were to be elected at an early date. In the latter list the title professor of economic entomology and lecturer on insects injurious to vegetation appeared.

This long period between the opening of the university and the establishment of a full professorship of entomology was not, however, a period of inactivity in entomological work. A limited amount of instruction in this subject was given each year from the first, and the starting of an entomological collection was begun. Dr. B. G. Wilder, the professor of comparative anatomy and natural history, had given considerable attention to the study of insects, and had made what was considered at that time a large collection. He was able, therefore, to give in his course on zoölogy a fuller treatment of insects than was usual in courses of this kind. The gift of his collection of insects constituted the beginning of an entomological museum. The increase of this collection by additions made by students began at once. The most important of these additions during the first two years was a collection illustrating the transformations of the larger moths, which was made by Mr. W. D. Scott, who was then a special student in zoölogy.

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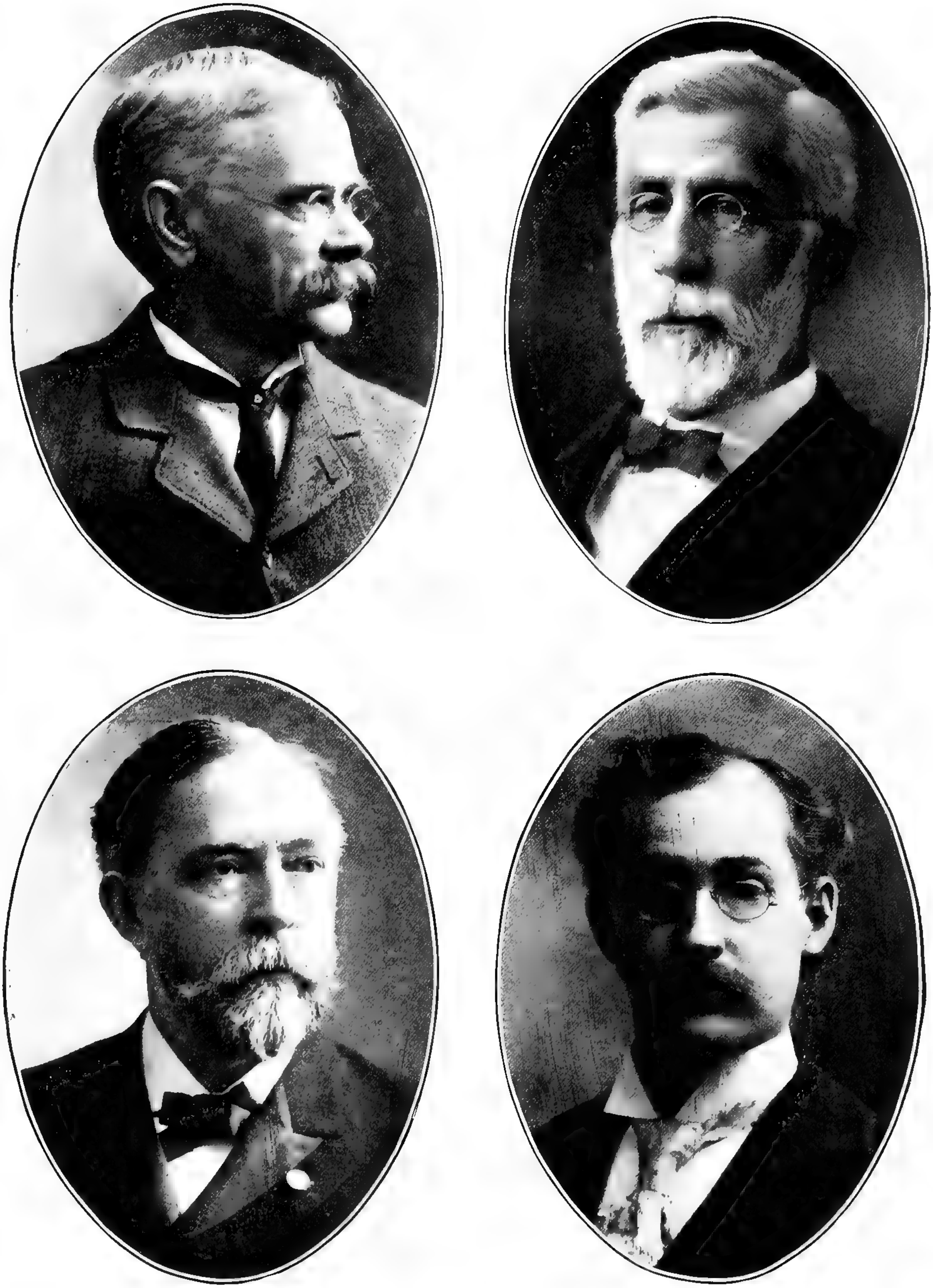
[1] Deceased.

At the beginning of the third year of the university, Mr. J. H. Comstock, then a freshman in the course in natural history, was appointed laboratory assistant to Professor Wilder. The very first task that was assigned to the young assistant was the arrangement in systematic order of the collection of insects and other invertebrates that had accumulated during the preceding two years on the shelves of the laboratory. The entire charge of this part of the collection was soon after placed in his hands by Dr. Wilder. The growth of his personal interest in this part of the work of the university thus began, the development of which has been associated with his life.

Mr. Comstock has been so intimately associated with the entomological work of the university, which is due largely to his ability, that the following bit of personal history is not out of place in the history of the department: While preparing for college Mr. Comstock became greatly interested in the study of insects, and determined that he would, if possible, devote his life to this study. The statement in the first general announcement of the university that a professor of entomology was soon to be elected, led him to come to Cornell, in order that he might study with this professor. Thus the opportunity to follow his chosen specialty came to him in due time in a very unexpected way. It came much earlier than would have otherwise been possible, but for the policy of the senior professor of zoölogy of encouraging his assistants, and stimulating their development, by placing large responsibilities upon them.

During the fourth year of the university (1871-72) thirteen students in the courses in agriculture and natural history petitioned the faculty of the university to allow Mr. Comstock to give a course of lectures on insects injurious to vegetation. This petition, having



DEPARTMENT OF NATURAL HISTORY

John Henry Comstock
Simon Henry Gage

Burt Green Wilder
Mark Vernon Slingerland

the approval of Professor Wilder, was granted, and a course of lectures extending through the spring term of that year was delivered. This was the first course devoted entirely to entomology which was given in this university.

At the close of this year an arrangement was made by which Mr. Comstock spent the summer in study with Dr. Herman A. Hagen at the Museum of Comparative Zoölogy of Harvard College. This short period of study had an important influence in the development of the department of entomology, which was soon afterward established at Cornell. Dr. Hagen not only gave daily lectures to his single student, but the great entomological collections of that museum were thrown open to his unrestricted use. In this way he was able to gain a knowledge of museum methods and of systematic entomology, which was of great importance to his future work. The undetermined species in the Cornell collection at this time were taken to Cambridge and classified by comparison with the collections there, and in the museum of the Boston Society of Natural History.

In the fall term of the following year (October, 1872), a course of twelve lectures on economic entomology was given by Mr. C. V. Riley, then state entomologist of Missouri; and in the spring term of the same college year (May 2, 1873), provision was made for continuous instruction in this subject, by the appointment of Mr. Comstock as instructor in entomology. A separate entomological laboratory was at once established in one of the upper rooms of the tower of McGraw Hall, the room adjoining the upper gallery of the museum; and thus a modest beginning of a distinct department of entomology was made.

Within a month after the establishment of the department, it received from Mr. H. H. Smith the gift of his collection of insects, a collection which represented about two years of field work on the part of this unrivaled collector. The specimens were mostly unclassified. But they were immediately placed in the hands of specialists for determination, and soon became available for the use of the department. The collection was especially rich in *Hymenoptera* and *Diptera;* and as the former were determined by Mr. E. Cresson, and the latter by Baron Osten-Sacken, they became of exceeding value.

The growth of the department for a considerable period was necessarily slow. The instructor, being still an undergraduate student, could give only a part of his time to it, and the funds at the disposal of the department did not admit of the purchase of any specimens, and of but few books. But so hearty was the sympathy and encouragement extended to the young instructor by President White, Professor Wilder, and other members of the faculty, that the lack of time, of specimens, and of books was hardly considered. Another source of great encouragement in those days of small beginnings was the attitude of the students. If any of them marked the crudeness of the facilities offered, they did not express it by word or look, but each did his part to make the work as successful as possible.

In the summer of 1875 plans were made for an extension of the department of entomology by transferring to it the work in invertebrate zoölogy. In anticipation of this change, a leave of absence was granted to Instructor Comstock, in order that he might spend a part of the following year in study with Professor Verrill at Yale College. This he did, returning in time to give his lectures on entomology in the spring term.

The proposed extension of the department was made in the fall of 1876 by the promotion of Instructor Comstock to the rank of assistant professor, with the title of assistant professor of entomology and general invertebrate zoölogy. The title indicates the direction in which it was determined that the growth of the department should proceed. Although instruction was to be offered in the general subject of invertebrate zoölogy, the department was to remain essentially entomological. This was in accordance with the plan of organization of the university by which subjects relating to agriculture were to receive especial attention.

In carrying out this plan, however, the constant aim of the instructor has been to give the students thorough training in the science of entomology. It has seemed wiser to enable the students to lay a broad foundation for their entomological studies by giving them a thorough knowledge of the structure and development of insects injurious to agriculture. At the same time, great pains have been taken to present in lectures and field work the applications of the science. This has been largely accomplished by selecting, for purposes of illustration, those species that are of economic importance.

In addition to the desire to strengthen the work of the College of Agriculture there has been another important factor in determining the direction of the growth of the department of entomology. Owing to the difficulty of studying marine animals at any place remote from a sea coast, and to the exceptionally good facilities for the study of insects at this university, it has been felt that the best interests of science would be subserved by concentrating our advanced work on insects, and frankly advising those students that wish to make a special study of marine forms to go to some university situated near the sea. It has seemed better to lead in one specialty than to hold a mediocre place in the whole field. An opportunity is offered the student to lay a broad foundation for zoölogical studies by lectures covering in a general way the field of invertebrate zoölogy, and by a study in the laboratory of a wide series of typical forms, illustrating the more important groups of invertebrates. These two courses, taken in connection with similar courses offered by the department of physiology and vertebrate zoölogy, afford the instruction needed in zoölogy by students in the general courses, and serve as an introduction to the more advanced work of those who wish to make a special study of zoölogy. Such students can then continue their study of insects or of vertebrates at this university, or can take up the special study of marine forms at some of the seaside laboratories.

The summer of 1878 was spent by Assistant Professor Comstock in the Southern States, as a special agent of the United States Department of Agriculture, making a study of the insects injurious to cotton. The results of these studies formed the basis of an exhaustive report published by the government in 1880. In the spring of 1879 Mr. Comstock was called to the position of Entomologist of the United States Department of Agriculture. Appreciating the value of the experience to be gained in this position, and at the same time being unwilling to sever permanently his connection with Cornell University, he requested and obtained a leave of absence from the university for two years. During his absence the work of this department was carried on by Assistant Professor William Stebbins Barnard. Dr. Barnard was a graduate of Cornell of the class of 1871, and had taken the degree of Ph. D. at Jena in 1873. He had served as lecturer on *Protozoa* at the Anderson School at Penikeese in 1874, and had resigned the position of professor of natural science at Oskaloosa College, in order to accept the position at Cornell.

During Dr. Barnard's administration of the department he made important contributions to our knowledge of the habits of certain insects. The most notable of these was his account of the habits of the pear *psylla*, which was published in the proceedings of the American Association for the Advancement of Science for 1879. In this paper he pointed out the serious nature of this pest, which ten years later destroyed many of the pear orchards of this state, and was the subject of an exhaustive investigation conducted by this department in 1891 and 1892.

Immediately after the return of Mr. Comstock at the expiration of his leave of absence in 1881, the laboratory was moved from its limited quarters in McGraw Hall to its present home in White Hall.

During the year 1881-82, much time was given to the completion of certain investigations begun in Washington but left incomplete. Financial aid was furnished by the government, including the salary of an assistant, Mr. Henry Ward Turner. The results of these investigations were published, partly in the annual report of the United States Department of Agriculture for 1881, and partly by the university in the second report of the Cornell University Experiment Station (1883).

At the close of the year 1881-82, Mr. Comstock's connection with the government work ceased; and early in the following year he was promoted to a full professorship. This promotion placed the department of entomology on a footing co-ordinate with the other departments of the university.

On the completion of the investigations for the United States Government, Professor Comstock began a task which he had long had in mind, the preparation of a text-book of entomology. The need of a suitable text-book had been a serious obstacle to the work of instruction, and it seemed clear that the most important thing to be done for the advancement of the department was the preparation of such a work. As American entomology is still in its infancy, it is impossible to compile a satisfactory text-book; its preparation must necessarily be to a great extent original work, based on the study of specimens.

Although the entomological collection had become of considerable size, it was still inadequate for the purpose. Fortunately the financial condition of the university at this time was such that appropriations could be made for the purchase of specimens; and there began a systematic filling up of the more important gaps in the collection, which has been continued to the present time; so that now, with the exception of the great collections of insects at Cambridge, Philadelphia, and Washington, ours is one of the most important in the United States.

At the same time that the increase of the entomological collection by purchase began, important additions were made to the illustrative material in other departments of invertebrate zoölogy. Among these additions was a complete set of the glass models of invertebrates made by Blaschka.

During the growth of the entomological collections, much thought has been given to the methods of arranging and displaying specimens in the museum. This has resulted in the development of a new method of arranging them, which is known as the block system. This method allows the rearrangement of a collection with great facility, and the interpolation of new material at any desired point.

The rapid growth of the collection rendered necessary the employment of help in the laboratory, and in the fall of 1883 Mr. J. M. Stedman was appointed laboratory assistant. Mr. Stedman held this position five years, after which he became assistant in entomology in the Agricultural Experiment Station for two years.

In 1891 Mr. Alexander Dyer MacGillivray was appointed assistant in entomology; and in 1900 he was made instructor in entomology, which position he now holds.

In 1899 Mr. Mark Vernon Slingerland, the assistant entomologist of the Experiment Station, was appointed assistant professor of economic entomology; since then he has devoted a part of his time to instruction.

In 1899 another assistantship was established by the appointment of Mr. William Albert Riley as assistant in entomology.

In 1901 Mr. Riley was made instructor in entomology, completing the present organization of the teaching force of the department, which consists now of one professor, one assistant professor, and two instructors.

On April 30, 1888, the Cornell University Agricultural Experiment Station was established under the provisions of a national law known as the "Hatch Act." At the organization of this station it was decided to give considerable attention to entomological investigations, and there resulted in consequence a considerable enlargement of the scope of the work of the entomological department of the university.

In order that the new duties of the department might be carried on with the greatest facility, a building especially designed for the purpose of experimental entomology was planned and erected. This building, the first of its kind, was named the Insectary, and has served as a model for similar buildings at several of the experiment stations in other states, and at the Department of Agriculture in Washington.

At first the entomological work of the experiment station was conducted by Professor Comstock, and he published several bulletins as the result of his investigations. In 1890 Mr. Mark Vernon Slingerland was appointed assistant entomologist of the Experiment Station. During that year and the following one, bulletins on fruit insects and on wireworms were published jointly by Professor Comstock and Mr. Slingerland. Since that time the entomological work of the experiment station has been conducted almost entirely by Professor Slingerland, and many well-known bulletins have been published as the result of his investigations.

The new duties connected with the establishment of the experimental work at the Insectary necessitated an interruption in the preparation of the text-book of entomology, upon which Professor Comstock had been engaged for six years. This work was about one-half written, and as its completion seemed indefinitely postponed by these new duties, that part which was ready for the printer was published under the title, *An Introduction to Entomology, Part First.* Three years later work on the text-book was resumed, and in 1895, with the collaboration of Mrs. Comstock, it was completed and published under the title, *A Manual for the Study of Insects.* A striking feature of this book is a large number of original wood engravings of insects engraved by Mrs. Comstock.

Other text-books, the outgrowth of the work of the department, are the following:

Guide to Practical Work in Elementary Entomology, by J. H. Comstock. Ithaca, 1882.

The Elements of Insect Anatomy, by John Henry Comstock and Vernon L. Kellogg. Ithaca, 1899.

Insect Life, by John Henry Comstock. New York, D. Appleton & Co., 1897.

A Classification of North American Spiders, by John Henry Comstock. Ithaca, 1899.

How to Know the Butterflies, by John Henry Comstock. New York, D. Appleton & Co., 1904.

Many papers on entomological subjects have been published in various scientific journals by members of the teaching force and by advanced students.

During recent years considerable entomological teaching has been done by Mrs. A. B. Comstock in the course of her work as lecturer on nature study. This has been with university classes, and in teachers' institutes throughout the state.

Mrs. Comstock has published a volume on the habits of insects, entitled *Ways of the Six-Footed* (Boston, Ginn & Company, 1903). She has also published teachers' leaflets on the same subject in connection with the University Extension work in Agriculture.

Although only a small proportion of the students who have studied in this department have done so with the view of becoming specialists in entomology, a very important part of the work of the department has been the training of such specialists; this is shown by the following list of official entomologists that have been trained in this department:

Africa—C. B. Simpson, Entomologist to Transvaal Colony.

Arkansas—Ernest Walker, Entomologist of the Arkansas Agricultural Experiment Station.

California—Vernon L. Kellogg, Professor of Entomology, Leland Stanford Jr. University.

Delaware—C. O. Houghton, Entomologist of Agricultural Experiment Station of Delaware College.

Hawaii—D. L. Van Dine, Entomologist Hawaii Agricultural Experiment Station.

Iowa—H. E. Summers, Entomologist of the Iowa Agricultural Experiment Station.

Japan—S. I. Kuwana and S. Hari, Entomologists at the Central Agricultural Experiment Station in Tokio.

Kansas—S. J. Hunter, Professor of Entomology in the University of Kansas.

Louisiana—H. A. Morgan, Professor of Zoölogy and Entomology in the State University.

Michigan—R. H. Pettit, Entomologist of the Experiment Station of Michigan Agricultural College.

Minnesota—A. J. Ruggles, Assistant Entomologist of the Agricultural Experiment Station of the University of Minnesota.

Mississippi—G. W. Herrick, Entomologist of the Mississippi Agricultural Experiment Station.

Missouri—J. M. Stedman, Entomologist of the Experiment Station of the Missouri Agricultural College.

New Hampshire—C. M. Weed, Entomologist of the Experiment Station of the College of Agriculture.

New York—E. P. Felt, State Entomologist, Albany. M. V. Singerland, Assistant Entomologist Cornell University Agricultural Experiment Station. A. D. MacGillivray, Instructor in Entomology in Cornell University. W. A. Riley, Instructor in Entomology in Cornell University.

North Carolina—F. Sherman, Jr., Entomologist in the Agricultural Experiment Station. G. M. Bentley, Assistant Entomologist of North Carolina.

Ohio—J. S. Hine, Assistant Professor of Entomology, Ohio State University.

Ontario—W. Lochhead, Professor of Biology in the Ontario Agricultural College.

Pennsylvania—H. A. Surface, Economic Zoölogist in the Department of Agriculture of the State of Pennsylvania.

Texas—E. D. Sanderson, Professor of Entomology in the Agricultural and Mechanical College of Texas.

PHI GAMMA DELTA

Utah—R. V. Chamberlain, Professor of Zoölogy in the University of Utah.

United States Department of Agriculture—L. O. Howard, Chief Entomologist. F. H. Chittenden, in charge of breeding experiments. A. L. Quaintance, in charge of investigations of the bollworm. Nathan Banks, Assistant Entomologist. A. C. Morgan, Temporary Field Agent. W. W. Zothers, Temporary Field Agent.

West Virginia—W. E. Rumsey, Entomologist Agricultural Experiment Station of West Virginia.

Neurology, Vertebrate Zoölogy, and Physiology

The zoölogical division of the university, with the exception of veterinary science, was first entrusted to a single professor, with the title of professor of comparative anatomy and zoölogy, and the department represented by him was first called the medical. This was soon changed to anatomical. The title of the professor was changed to that of professor of physiology, comparative anatomy, and zoölogy (1878), which became later professor of neurology, vertebrate zoölogy, and physiology (1893), its present form, indicating the three courses personally conducted during the three terms of the college year. In the earlier years instruction in invertebrate zoölogy, excepting insects, was shared, in part, with the professor of geology and palæontology.

At the wish of President White, who laid great stress upon an elementary knowledge of physiology by all students, Dr. Wilder delivered for nearly twenty years a course of lectures in the principles of physiology and hygiene. This course occupied one term, and the lectures were given three times a week. These lectures continued until the year 1896, when all the work in the general courses was made elective.

In 1871-72 the course in the winter term was devoted to comparative neurology, and that in the spring to human embryology, thus, it is believed, antedating the period of such specialization outside of some of the larger medical schools. A course in the experimental physiology of muscle and nerve was given in 1880 and 1881, but abandoned for want of suitable apparatus. The anatomical laboratory was a basement room in the south end of Morrill Hall. After the first two years an adjoining room was available, and later a small room on the third floor. Upon the completion of McGraw Hall in 1871, the only laboratory space was found beneath the rising seats of the lecture room, which was reserved for the head of the department and special students. Later the basement was fitted up for general laboratory work. When the department of architecture was removed to Lincoln Hall, the rooms thus vacated were assigned to the department of zoölogy and comparative anatomy. There are now in the north wing rooms for the professor and his assistants, also a neurological laboratory. The horizontal division of the lofty lecture room enables it to be used for practicums as well as lectures, and provides four rooms above for storage.

The large room on the fourth floor of Morrill Hall was at first used for lectures in common with other departments. The lecture room in McGraw Hall was shared for many years with the geological department, and is now used in the fall and spring for the courses in invertebrate zoölogy and entomology.

The Auzoux models and other objects constituted the nucleus of the museum, and were first accommodated in a room on the second floor of Morrill Hall. Until recently the vertebrate collections have occupied cases in McGraw Hall, joining and commingled with cases containing collections of several other departments. Under these circumstances no proper scientific arrangement has been practicable.

Besides the general effect of the teachings, writings, and example of the elder Agassiz upon all branches of natural science in America, his influence was exerted directly upon this department in the university on three occasions. In 1867 his counsel was given as to its organization, when his recommendation led to the appointment of Professor Wilder; and again at the opening of the university, when he was present and gave an encouraging address; he also remained to deliver a course of twenty lectures on zoölogy, which, to use the words of an alumnus who heard them, "were more useful to the university than any other one thing."

Professor Agassiz enlisted the co-operation of Professor Wilder in making a series of preparations of the brains and embryos of domesticated animals for the Museum of Comparative Anatomy in Cambridge, with the privilege of publishing the results of his discoveries. Since that time the professor has made neurology his special study, and his lectures and writings upon the subject have contributed to develop this study without as well as within the university (1871).

An entrance requirement in physiology and hygiene was early included among the elementary subjects for admission to all courses in the university, and the standard has been steadily raised. So far as is known this antedates any similar scientific requirement for admission to any American university.

Although the department possessed the only compound microscope in the university, no advanced work was done with it, or systematic instruction offered in its use, until 1873. In that year Dr. W. S. Barnard, of the class of 1871, returned from Germany after a course under Gegenbaur, Leuckhart, Haeckel, and others.

During the two following years he did much original work as a graduate student in histology, and in the study of the protozoa. In the fall of 1873 a freshman, Simon H. Gage, succeeded Professor Comstock as helper in the laboratory. His zeal and ability, his prompt mastery of microscopical methods, his patience, and especially his early manifestation of the rare and precious quality which may be designated as morphological insight, caused him to be entrusted more and more with the personal instruction of the laboratory students, whose numbers and requirements were then rapidly increasing. In the year 1878 he was appointed instructor, and abandoned the idea of practicing medicine; he was made assistant professor in 1881, and associate in 1889. It is gratifying and encouraging to state that these promotions were due, not to the discovery of his merits by other institutions, but to the recognition here of his value to Cornell as a man, investigator, and teacher. He has, however, declined several independent positions with higher salaries, because he appreciates the earnestness of his students, his opportunities for research and advanced instruction, and the spirit of mutual confidence and helpfulness that characterizes the whole department.

Since 1885-86 the courses in anatomical and microscopical methods, histology, and embryology have been substantially conducted by Professor Gage, with the assistance since 1889 of Dr. G. S. Hopkins. No more accurate or complete instruction in microscopical methods and in vertebrate histology is elsewhere afforded. Mr. Fish made a special study of the histology of the nervous system, so that unusual facilities were afforded for instruction and advanced work therein.

The very great advantages for the study of zoölogy in Ithaca were immediately recognized, and from the first every effort has been made to collect and investigate the local fauna. As the years have passed and the fauna has been more carefully studied, the advantages of the situation, with lakes at once isolated, and yet with remote connections with the ocean, have been fully appreciated. Furthermore, in the gigantic experiment due to the glacial epoch, and the restocking of the lakes and streams with aquatic life, there was promise of most interesting and far-reaching conclusions, to be attained by a careful study of the forms here presented. Believing in this great opportunity, the fauna, especially that of Cayuga Lake, has been the subject of the most extended and enthusiastic study on the part of both students and teachers. As all advanced and most graduating theses are based upon original observations and deductions, the various members of the lake fauna have served for subjects of theses. Many of the theses have been of great excellence, not only serving to initiate their writers into the modes of conducting and carefully reporting the results of investigation, but many of them have brought out unexpected facts and important generalizations. Among the members of the lake fauna the lamprey, the lowest fresh-water vertebrate, and the necturus, one of the salamanders with permanent gills, were early recognized as especially desirable for study and with promise of valuable results. The necturus has therefore largely taken the place of the more specialized frog as a representative amphibian and vertebrate. The advantages of the necturus have been clearly pointed out by Professor Wilder, so that now it is a common object of study in many universities, and although it is found in other waters of the country, most of those studied are obtained from Cayuga Lake. The same animal presents unusual advantages for microscopical instruction and research. Its histologic elements or tissues are so coarse that they are easily studied. Indeed its blood corpuscles are so large that they may be seen with the unaided eye. Possibly no other animal shows so well the circulation of the blood, or has done more to arouse interest in physiology, and to cultivate an appreciation of the marvelous and beautiful things in nature, if we only look beyond a somewhat unattractive exterior. The lamprey eel replaced later the ordinary fish as an object of study in the general classes in zoölogy, and served also for more extended investigations, which have not only added to our knowledge concerning the species and the group, but have led to general conclusions of great value concerning the possibilities of evolution.

As an introduction to human, comparative, and veterinary anatomy and physiology, the domestic cat was employed for dissection, for museum specimens, and for experimentation. At one time about 400 of these were consumed annually.

It was one of the doctrines of the department that the members of the class in zoölogy should be able to observe the natural behavior of the objects of their study. Hence, in addition to what may be called the " stock series " of representative forms—cats, frogs, necturi, and other salamanders, alligators, turtles, serpents, amias, and lampreys,—less common animals were kept alive in cages or aquariums, freely accessible to the students and the public. The general and deep interest aroused by living animals, and the usefulness of their study, suggest the possibility of a zoölogical garden which it is hoped may sometime be established either by the city or by the university.

For several years after the opening of the university, the animals for demonstration and dissection were obtained as needed, and kept but a short time before they were used. This rather primitive method became impracticable, however, as soon as the number of advanced and laboratory students increased. To avoid the delay occasioned by going out to secure an animal when it was required, and to render the work more prompt and satisfactory, there was prepared what was known in the department as the "frog spring." At a short distance from the university is a series of springs along the margin of Fall Creek. One of these was carefully dug out and supplied with a bottom and walls of Portland cement. Into this aquarium the water from a spring flowed, the outlet being diagonally opposite. A partition of wire separated it into two rooms, and a heavy oak cover with locks enclosed it from above, so that the animals in it would not be disturbed by predacious creatures like the mink, or the ordinary biped bent on mischief. In this spring, the winter supply of frogs, a stock of necturi, and other aquatic animals were kept, and specimens were obtained as desired. This spring proved one of the most truly economical acquisitions of the department.

For storing the barrels of alcohol and other inflammables, and as a home for the cats and other of the higher animals used for dissection and demonstration, a deserted workman's cottage was first utilized, not far from the laboratory. When this was removed to give place to Lincoln Hall, a special building was put in the forest back of Sibley College. This building served, like the old one, for the live cats and other mammals used for dissection, and for the storage of alcohol, petroleum, and rough specimens. This building with its contents (including the bones of an elephant) was destroyed by fire in June, 1892. The Ithaca Fire Department was summoned by an enthusiastic instructor to put out the conflagration, and ascended the hill for that purpose. Separate rooms in the basement of McGraw Hall now supply its place.

The sums available from the annual appropriations for the increase of the museum have been very small.

Through the efforts of President White, a single grant made it possible to secure many important specimens from Ward's natural-science establishment at Rochester, but much is still needed to complete the series.

With the exception of some mounted skins and skeletons, nearly all the specimens exhibited in the museum have been prepared by members of the staff or their student assistants. Some of the preparations which they have made are not only instructive but elegant and even unique.

Donations to the museum have been numerous, and often valuable. Besides constant remembrances from former students, there should be mentioned particularly the collection of three hundred mounted birds, mostly from North America, from the late Mr. Greene Smith of Peterboro; weapons and implements from barrows in England, belonging to different periods, from the late Professor George Rolleston of Oxford University; and the woodpeckers of North America, beautifully mounted, from the late George Sutton of Newark Valley, N. Y.

To render the educational value of the museum as great as possible, it is intended that each specimen shall be accompanied by a concise statement of the most important facts respecting it in particular, and such specimens in general; and, if it is an anatomical preparation, also a figure or photograph bearing the names of the principal parts, and an enumeration of the points illustrated by it.

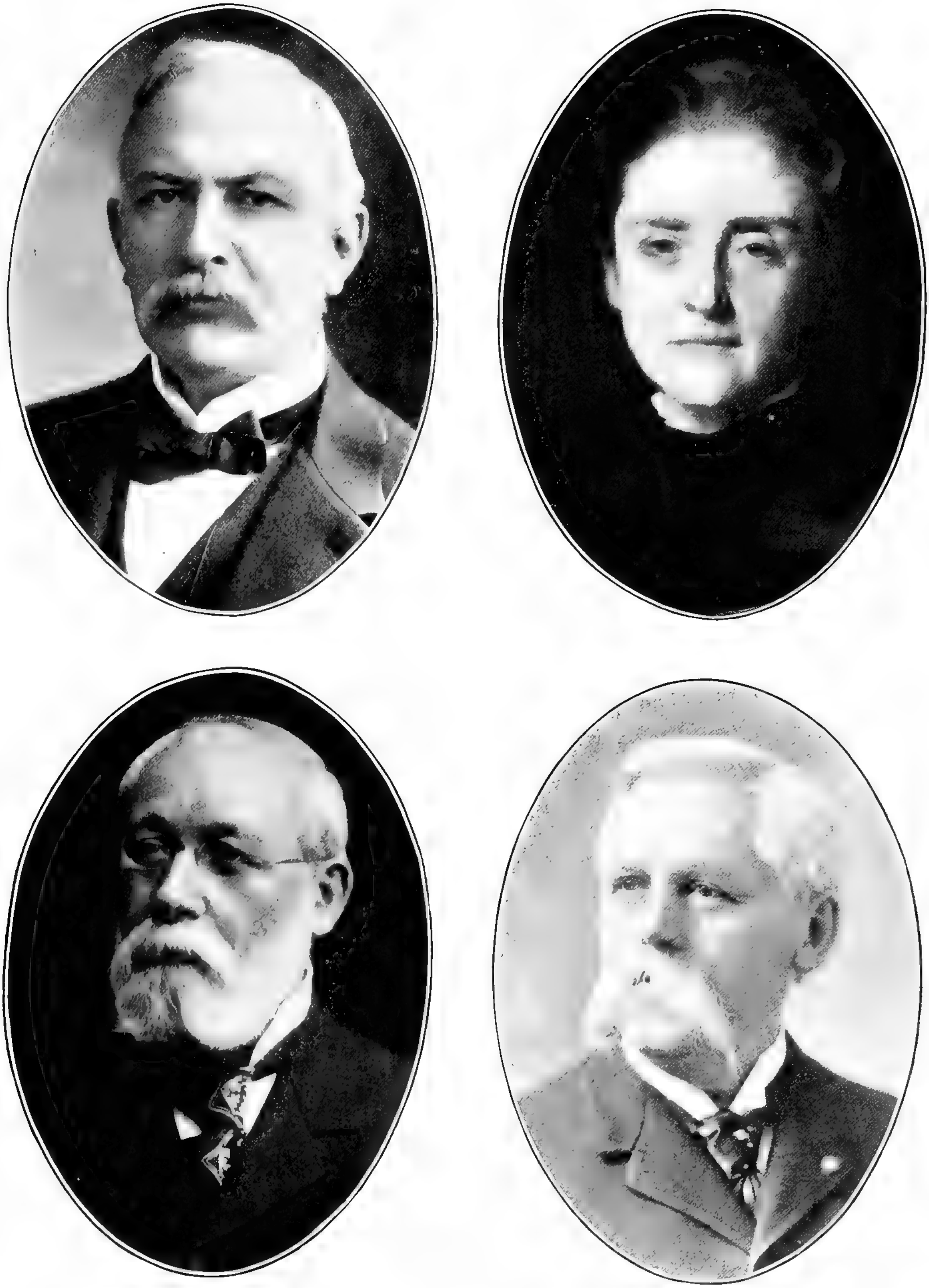
It is one of the canons of the department that all of the work done by the student in investigation shall be accurately described; but as verbal descriptions alone are inadequate, careful drawings are required as an essential part of the description. Since 1873 photography has been very largely employed in the exact delineation of complex objects. It was early seen, however, that in order to render photography applicable to the reproduction of figures of the great variety of objects studied it would be necessary to devise some means by which the specimens could rest in the position most natural and least liable to injury; sometimes in a liquid to support delicate parts and prevent their collapse. Hence a vertical camera was designed by Professor Gage. In photographing with this, the object rests horizontally, and the camera points directly downward. With this camera hundreds of pictures of the most varied objects have been made, many of which have served as the basis for drawings to illustrate special investigations; and some, of entire animals photographed in the water, have served for half-tone and photogravure reproduction. Rare animals or specimens are photographed upon their receipt by the department before dissection, and frequently during various stages of dissection. Fresh fishes and other aquatic animals are photographed under water, either immediately after death or while etherized. In this way the fins and other flexible parts float out in the natural condition, and a most truthful picture of the animal is obtained.

In 1867 Professor Wilder recorded his observations, made references and drawings, and pasted clippings upon slips of paper about three by five inches; filed in portfolios they were readily multiplied, rearranged, or eliminated. The " slip system " was described in 1868 as " A method of recording and arranging information," and is now in general use here and elsewhere. Upon stiffer slips were written the titles of publications and data as to museum specimens. Each animal receives an " accession number," and if it is divided so as to constitute two or more specimens each part bears the same number for identification.

Alinjection designates the method of preparing and preserving animals or their parts, and especially hollow organs, by the injection of preservatives into the arteries or the cavities. The transmission of preservative liquids to the tissues by a constant pressure-apparatus connected with the vessels by which blood reached the parts during life is really so simple as well as effective, that it is hard to account for its comparatively infrequent adoption. Without previous acquaintance with what had been done by others, Dr. Wilder began, with the co-operation of Professor S. H. Gage, on October 7, 1883, upon the body of a young chimpanzee, an alinjection of the entire body, which was prolonged for ten days, and was completely successful. In November, 1885, a manatee, 150 ctm. long, was prepared in like manner; all the cats used by the general class in physiology are alinjected and packed away till wanted; still-born children are commonly so preserved, and all anatomical material in medical dissecting rooms may be thus rendered innocuous, free from unpleasant odor, and fit for prolonged and thorough examination.

Since 1880 the members of the department have united in an effort to improve the terminology of anatomy in two ways: First, as to the terms of position and direction; to employ such as relate to the organism itself and are applicable to all the vertebrates, *e. g.*, dorsal and ventral for posterior and anterior, or upper and lower. Second, to replace the names consisting of two or more words by names of one word, *e. g.*, corpus callosum by callosum; commissura anterior by precommissura. The objects attained by the change are brevity; capacity for adjective inflection, and substantial uniformity in all languages, since the Latin original can be adopted with unessential changes to modern languages.

What effect the precept and example of this depart-



TRUSTEES

Joseph Benson Foraker (1884-1889)
Robert Borthwick Adam (1895-1904)

M. Carey Thomas (1895-1899)
William Ozmun Wyckoff (1895)

ment may have exerted cannot now be estimated, but progress is making steadily along these lines irrespective of the general adoption of any special set of terms. Much of the success of the instruction has been due to the habit of consistently employing only one series of names in a given lecture, article, or book.

The head of the department is in the habit of urging his students to strive in composition for *clearness, consistency, correctness, conciseness,* and *completeness.* These he calls his five C's.

In all the courses, general as well as special, in the laboratory work, and in publication, weights, lengths, and volumes are stated in the metric system, although the common equivalents are sometimes added.

The lectures in physiology have been illustrated by experiments mostly upon the cat and frog. But the charge of cruelty cannot be maintained against the department.

" Although our subject is the physiology of *man,* yet —because most of the organs are out of sight and experimentation upon human beings is limited—the bulk of accurate physiological knowledge has been gained from *animals,* and must be illustrated therefrom.

" All the experiments in this course are (and always have been) performed upon animals just killed or completely anæsthetized; the utmost pain inflicted is in killing a frog by ' pithing ' with a sharp knife, and this is approved as a humane method of slaughtering animals for food. The writer holds that nothing more is warranted in the way of *illustrative* experiment; his proposition that the two kinds of vivisection should be verbally distinguished as *sentisection* and *callisection* (the latter from the Latin *callus,* insensitive) was published in *Nature* at the request of the late Charles Darwin."

No lecture in the department has ever been given without specimens or models, and sometimes as many as forty different specimens are brought from the museum or laboratories to illustrate a single lecture. When practicable they remain for more leisurely examination by the class.

Each class, whether general or special, is invited to regard the lecture room as its " study " for the term, and there is unrestricted access to the specimens, books, and diagrams.

The museum now contains more well prepared human cerebrums than any other institution in this country. The objects of the collection were thus set forth by Professor Wilder:

" THE NEED OF PARTICULAR BRAINS.—From the physiological and psychological standpoints it is very desirable to study the cerebrums of persons whose mental or physical powers were marked and well known. The present condition of things is illogical and unprofitable. We scrutinize and record the characters and attainments of public men, clergymen, and friends, whose brains are unobtainable. We study the brains of paupers, insane, and criminals, whose characters are unknown, or perhaps not worth knowing.

" Another aspect of the matter is the need of a fissural standard, based upon the careful comparison of large numbers of average, intelligent, educated, and moral individuals, excluding the eminent as well as the immoral, the ignorant, and the insane.

" It must be borne in mind that the fissural pattern of the average intelligent, educated, and moral human being is undetermined."

When the university opened and for several years afterward, all of the instruction was given by the head of the department. After a lecture to a large class of freshmen, he gave special instruction in the laboratory, thus passing from the simplest facts in anatomy and physiology to a discussion of the profoundest problems in transcendental anatomy. As there were many things to be done, like arranging diagrams, and putting away specimens, etc., and students with limited means were anxious to do something to aid in their support, there arose the custom of having *student assistants.* The number of students employed to render assistance of various kinds in the anatomical department has been, from first to last, quite large, and many have been enabled to complete their university course by the money thus earned. But while this compensation was important, the inspiration gained by the students from the intimate association into which they were brought with the head and other teachers of the department, was of greater value. This association was at once pleasant and stimulating. No student assistant was ever asked or expected to render any service that the teacher himself was afraid or ashamed to undertake, consequently a dignity was given to the work of the department, often disagreeable in itself, and the assistants only needed to know what was desired in order to accomplish it. The intimate knowledge and manipulative skill gained by this co-operation were regarded by more than one of those assistants as an ample recompense, even if no money had been received.

Early in the year 1893-94, a series of weekly conferences was begun, in which Professor Gage also participated, at which recent observations or conclusions of the speakers or other neurologists were presented and discussed.

The actual work of the department has always been in advance of the facilities offered. If the only room was a poorly lighted basement or the triangular space under the rising lecture seats, the most advanced work was always in progress, such as gave the students the real and living knowledge that would enable them to do their part in life honorably and to be in the front rank.

When apparatus or books were not furnished by the university, the teachers supplied the need at their own expense.

The methods of work, and the subjects for special study in biology have changed greatly since the opening of the university, and an honorable part has been taken by this department in bringing about these changes. As stated above, one of the features of the instruction has been a combination of laboratory practice and lectures for all students doing special work in the department; from the beginning the general courses in physiology and zoölogy have been abundantly illustrated by lecture room experiments, and the exhibition of specimens as well as by special demonstration; but so fully was the head of the department convinced of the necessity of personal contact of the student with specimens, that he conceived the plan and took the bold step of making practical work a constituent part of the general lecture courses, so that even with classes numbering two hundred, a third of the time was given to the "practicums." This began in 1880-81 in zoölogy, and in 1886-87 in physiology. When this was publicly announced at a meeting of the American Society of Naturalists in 1883, it seemed like a hazardous innovation, but time and experience have shown the wisdom of the step, and also that the large majority of general students appreciate real knowledge and are willing to undergo the slight inconvenience of attaining it. For the general classes, the material to be studied—cats, sheep-hearts, brains, eyes, etc.,—are preserved in alcohol and prepared so that the minimum of dissection is required of the student. That minimum, however, is considerable, and its accomplishment in the time available is only possible by the aid of printed directions, and of assistants, mostly advanced students, who stand ready to explain difficult points.

Whenever it was found desirable to introduce new subjects into the curriculum, the head of the department, with indefatigable zeal and energy, took the work upon his own already overburdened shoulders or encouraged some of his assistants to undertake it. Thus the special lecture and laboratory courses in anatomical methods, microscopy, embryology, general histology, and the special histology of the nervous system, have arisen. The equipment of those courses was at first very inadequate, but earnestness and enthusiasm, while they could not take the place of proper appliances, still made the courses eminently successful and inspiring both to students and teachers. Every step in advance so thoroughly proved its wisdom that material equipment was soon provided, until now it is so complete for the above courses that no student, graduate or undergraduate, is hampered for the want of opportunity, and his attainments are limited only by his own ability.

In the work of the department, as to both research and instruction, while accuracy of observation, description, and delineation have been insisted upon, the mere accumulation, publication, and communication of isolated facts has never been sought; the effort has been rather to co-ordinate and correlate the facts, and to determine their bearing upon general or special questions in morphology, teleology, or classification.

Several hundred graduates of this and other universities have worked in the laboratories of this department.

The publications of the members of the departmental staff embody the results of original investigation in zoölogy, physiology, and histology, or describe new methods devised in the laboratory. Many of these methods have found wide application elsewhere.

Some of Dr. Wilder's most distinguished pupils, upon the completion of a quarter of a century of service in the university, prepared and published a volume of original contributions to science, commemorative of their affection and gratitude.

The presentation of a copy of the volume formed one of the incidents of the morning exercises in the library lecture room at the celebration of the twenty-fifth anniversary of the opening of Cornell University, October 7, 1893.

The following address was made by Dr. Theobald Smith, '81, of Washington, D. C., now of Harvard University.

"The very pleasant task has been assigned me to present to you to-day, on the happy and successful close of a quarter-century of service in this university, the congratulations and good wishes of your former students. To make their expression of regard toward their teacher something more than a matter of mere form, this volume has been put into my hands to present to you. It is made up of original contributions to science from fifteen of your former pupils. Its dedication reads as follows: 'To Bert Green Wilder, B. S., M. D., Professor of Physiology, Vertebrate Zoölogy, and Neurology in Cornell University, this volume is dedicated by his former pupils as a testimonial of their appreciation of his unselfish devotion to the university, and in grateful remembrance of the inspiration of his teaching and example.'

"This dedication will leave no doubt in your mind concerning the character of this volume. It is what has been known for some time in German universities as a *Festschrift*. It is a newcomer to American university life, and as yet without a fitting name.

"We might have couched our congratulations in some form which would have been of more personal value to you, or which would have tended to more display and less labor on our part, or which would have included as active participants a larger number of the 3,261 students who, at one time or another, have come under your personal instruction. But we assumed that the form chosen would best serve our university and meet your cordial approval at the same time. We knew that the most unselfish, the most widely useful offering would reflect best your attitude toward others. Our gift is therefore one which, inspired by your teaching and brought to successful completion in contemplation of the pleasure and satisfaction it was to bring you, is yet of no more value to you than to any other person who is in a position to make use of its contents.

" But the lesson of unselfishness is not the one we intended to emphasize. This volume has a few other thoughts to express which I shall try, however inadequately, to voice for its authors.

" It is, first of all, a witness to the fact that original research has always been an integral part of your work. However insignificant your facilities, however crowded your quarters, however burdensome the instruction, the long list of articles, monographs, and books, prefixed to this volume, bears ample testimony that you did not relinquish for a moment the development of new ideas under circumstances which would have discouraged many from rising above the level of a common-place routine. It has been said that it was a fortunate thing for us that your laboratories were so small and crowded, because all of your work was done in the presence of your pupils, and we could not very well escape the infection of your enthusiasm.

" In this volume there is also embodied a message to the university. I believe that I voice the sentiment of its authors when I say that a university is the only true place for research, and that when this spirit and its fruits are absent, a university does not deserve the name. It is true that original investigation may spasmodically show itself through private munificence or under government auspices, but the difficulty will always lie in the atmosphere, the environment. Those who devote themselves to the solution of problems whose virtues, like those of Emerson's weeds, have not yet been discovered, cannot hope to get light in an atmosphere befogged by a false utilitarianism.

" The ideals of a university are thus in entire accord with those which stimulate research. Cornell University has provided liberally for the maintenance of these ideals. The message of this volume is therefore twofold: It transmits the sincere thanks of its authors to the trustees and benefactors of this institution for what has been done to plant the seeds of which this volume is the early fruitage. It furthermore embodies the earnest wish that as this now great institution expands still more, original research may always be regarded as its main function; and that anyone who comes with the true ability and the genuine desire to search for the truth in any direction whatsoever, may receive a cordial welcome and find a comfortable and well-furnished home.

" It still remains for me to put this volume into your hands. May it add happiness to your life whenever you turn to its pages, and when the age of three score and ten shall have been reached, we shall look for the coming of another, larger *Jubelband* to find place by its side."

Professor Wilder in receiving the volume said:

" My former student, my later assistant, my longtime friend:

" The subjects are all important. Here are represented geology, botany, bacteriology, medicine, and surgery, comparative anatomy, entomology, evolution, and social science. With some of these topics my relation is very remote, and the honor radiating from this volume must fall in a great degree upon my colleagues and upon the university as a whole.

" My pardonable pride on this occasion is tempered by an ever present realization of shortcomings in ability and method, although never, I think, in purpose. But there is one feature of the Anatomical Department upon which we may reflect with satisfaction unalloyed. There has been always mutual confidence and cordial co-operation. Never at our table has sat ' suspicion poisoning his brother's cup.' Each has been kept informed of what all were doing, and we have never harbored that osteological bugbear, a ' skeleton in the closet.'

" Naturally these articles have been written by those who, like yourself, have taken advanced work in the department. For the rest of the 3,261 students whom it has been my duty and privilege to instruct, I have no higher wish than that they may resemble you and your collaborators. For I believe you have not cultivated the True and the Beautiful at the expense of the Good. In your lives you declare that above all intellect is character. You are exponents of the idea that the highest function of a university is—without neglecting the increase and dissemination of knowledge—to set the world an example of industry, justice, and purity of life.

" Upon this, the silver anniversary of my union with Cornell University, speech seems to have been expected, and I comply. Should I live to see the fiftieth return of the day, I trust there may be given me wisdom to maintain a golden silence, only pointing to the achievements of the pupils of those who have made this precious book."

Ex-President Andrew D. White, then minister to Russia, sent the following letter for this occasion:

" Your proposal to publish a *Festschrift* for Professor Wilder at the approaching university anniversary seems to me admirable from every point of view. Such a tribute would not only show a spirit most honorable to his old students taking part in it, and doubtless most acceptable to him as indicating the opinion of those best able to judge regarding his noble work at Cornell, but it would reveal a beautiful chapter in the records of American science, indeed several chapters, since Professor Wilder has not only done his own immediate work admirably, but has stimulated others to make most excellent contributions in other fields.

" There is one point on which Professor Wilder in the early days was able to render a special service outside of his chosen field, and I may be pardoned for referring to it here. While the university was in its earliest beginnings, a sort of nebulous state, I was greatly impressed by a remark by Herbert Spencer in his book on education, as regards the relative values of different kinds of knowledge. He named among the things to be taught to young men, human anatomy and physiology; and his arguments seem to me now to be absolutely conclusive. For apart from the practical part of these studies, they seem to form a most stimulating beginning to study in natural history generally, not perhaps the logical beginning, but the best practical beginning, as is shown by the fact that in all ages the great majority of students of note in natural science have been physicians. Under the influence of this impression I asked Professor Wilder to give a course of lectures every year to the freshman class on anatomy and physiology. Various arguments might have been used against this; it might have been said that, later in their course, students would have been better prepared to appreciate the fine points of such lectures, and the example of all the older institutions might have been pointed to in which such lectures, when given at all, were generally given as a hurried course in the senior year. But the idea of making an impression in favor of studies in natural science, and especially in human anatomy and physiology, just when young men were most awake to receive them, carried the day with me, and hence my request to Dr. Wilder. He acceded to it at once, and for several years, in fact until the pressure of other duties drew him from this, he continued these lectures, and it turned out that I had builded better than I knew; not only did the lectures produce admirable practical results, not only did they stimulate in many young men and women a love for natural science and give them an idea of the best methods in its pursuit, but they made a most happy *literary* impression upon the students generally; the professor's wonderful powers of clear presentation in extemporaneous lectures proved to be a powerful factor in literary as well as scientific culture.

" He came to us at the very beginning, and has borne the burden and heat of the day ever since; working with a devotion to science, to his students, to the university, and to all truth as it presents itself to him, in a way which has entitled him to the gratitude, love, and respect of us all.

" On his personal characteristics which we all appreciate so highly I surely need not dwell; the deep affection in which he is held by all who have known him best is worth more than all words; and I beg to tender to him through you the assurances of my sincere respect and gratitude, with the affection of an old colleague for one who bore burdens with him, and to whom he is so largely indebted for any success in the work entrusted to him.''

Histology and Embryology

Several independent chairs owe their origin to the scientific enthusiasm of Dr. Wilder. Among the chairs established at the foundation of the university was that of zoölogy and physiology, and one of the first courses offered, outside the traditional ones, was the course in natural history, the purpose of which was, while training men broadly in the modern languages, literature, and the physical sciences, to train them for biologists on the one hand, and for physicians on the other. The entrance requirements for this course were among the highest in the university; in addition to the elementary branches required for admission to any part of the university, this faculty (of natural history) required as preparatory to a full course leading to a degree: plane geometry, six books; plane trigonometry; Latin, Allen's Latin reader or its equivalent with an adequate amount of grammatical knowledge; Greek, the alphabet and so much of the language as would enable the student to recognize, analyze, and form scientific technical terms; and physiology.

Dr. Burt G. Wilder was called to fill the chair of zoölogy and physiology. He had been a student in the stern life of a military surgeon in active service during the Civil War. From his training under such masters as Agassiz, Wyman, Gray, and Holmes, he recognized clearly the educational needs of the future biologist. His experience in the medical service of the army had shown him also, and with awful clearness, the need of increased knowledge in medicine, and the demand for better educated physicians. He therefore aimed to make his department realize fully the possibilities resting within it. In doing this, he, in common with the

GOLDWIN SMITH HALL OF HUMANITIES

heads of the other scientific departments of the university, made much of the laboratory method. Lectures, recitations, and books were used as they probably always will be, but great stress was put upon bringing the student into direct contact with the truths of nature where he could see and interpret for himself, and thereby learn to be an independent thinker and investigator. Perhaps the best tests for the success attained by his efforts are the men who look back to his department with gratitude, and the departments which budded out from it and have since become independent.

At the time when the university opened, and for nearly two decades thereafter, there were two scientific questions stirring the entire civilized world. These were the doctrine of evolution and the rôle played by microscopic forms of life in producing disease. Professor Wilder, from his training and experience, naturally appreciated these two primal questions, one of supreme importance to the naturalist, and the other of equal importance to the physician. President White also with his usual farsightedness saw the importance of these two fundamental problems, and lent his powerful influence and encouragement in providing the means for cultivating all the branches of knowledge which should aid in their final comprehension.

On the one hand evolution constantly appealed to geology for the changing forms of life in time, and on the other hand it appealed to embryology, for the changes passed through by the individual in its development from the germ to the adult. To discern these embryological changes, and for the changes produced by disease, and for the organisms which were supposed to produce the changes, microscopes and skill to use them effectively were needed. In 1873 there were but two compound microscopes in all the departments of natural history. At present in the original departments and in those which have arisen from them, there are over two hundred. To meet the need for microscopical instruction and investigation, Dr. Wilder encouraged one of his student assistants to become proficient in the use of the microscope, and in histology and embryology, and with this encouragement the belief was expressed that there was an honorable and useful career open in this kind of work. The assistant thus encouraged was Simon H. Gage, at that time a student in the course in natural history, which he had entered for four years of study in preparation for the career of a physician. To him the development of this important branch of science is due. He has risen through all grades from that of student assistant (1874-77), instructor (1878-81), assistant professor (1881-89), associate professor (1889-95), and professor (1895). The facilities for scientific investigation were at the outset extremely meagre. All of the laboratory work in zoölogy, in physiology, and in microscopy was carried on in the space under the rising seats of the lecture room in the north wing of McGraw Hall. This room served as a museum and department office, as well as laboratory. It was not until 1879 that the basement of the north wing of McGraw Hall was finished for a laboratory in anatomy, physiology, histology, and embryology. In spite of its small windows and deficient ventilation, it was a great improvement over the space under the lecture room, and the extent and importance of the work constantly grew. Microscopes were gradually secured to meet the needs of the increasing numbers who sought the instruction, and thus, from its primitive environment, one of the best laboratories for microscopic work in the country was established. When the university library was moved from McGraw Hall to the Library Building in 1891, the rooms on the first floor of the north wing were devoted to histology and embryology, and the laboratory in the basement was reserved for work in comparative anatomy. Upon the completion of the New York State Veterinary College, this department became independent and was transferred to the Veterinary College, where for the first time it found ample accommodations. Six years later, in 1902, it removed to Stimson Hall, the building erected by Mr. Dean Sage, for the work in anatomy, physiology, histology, and embryology in the Ithaca division of the Cornell University Medical College. If one compares the modest beginnings of this department in the small room under the lecture seats, and in the basement of McGraw Hall, with the almost perfect laboratories and equipment of the present day, the material change will be found no greater than the relative change in the appreciation of the subjects which it embraced, and in their scientific and practical application in biology and in medicine.

It is natural that in the growth of the university more students interested in the medical than in the purely biologic side seek instruction in this department. The instruction has, however, been held steadily to the two main purposes—biology and medicine;—hence the young biologist and the young physician find in the course the matters especially adapted to them. The development of the work has followed strictly the method of the parent department. It emphasizes a personal inspection of the facts and phenomena of nature, and encourages independent thinking and interpretation, endeavoring above all things to create independent investigators and thinkers. The men who have gone out from the university into zoölogical or medical work have naturally and almost invariably pursued courses in this department. Many of these men have a world-wide reputation, and have added largely, and, in some cases, very fundamentally, to the world's knowledge.

The following courses are offered by this department:

An introductory course in microscopy, histology, and embryology, pursued by students of medicine and veterinary medicine, as well as by students electing it from the College of Arts and Sciences; an advanced course in histology and embryology; the structure and physiology of the cell, conducted by the professor of physiology; a seminary for conference, and the discussion of the advanced and research work of the department; the structure, development, and physiology of the nervous system, and the organs of special sense, conducted by the departments of anatomy, histology and embryology, and physiology.

Lectures and demonstrations accompany all the work to bring out the broad relations of the main features of the subject, recitations to insure definiteness of knowledge, and laboratory work where knowledge at first hand may be obtained by the student.

Professor Gage has written and published nearly eighty scientific papers. With Dr. B. G. Wilder he prepared the *Anatomical Technology for Students* (1882); with Dr. B. F. Kingsbury, a volume for students on *Histology and Its Methods* (1889). His book on the *Microscope* has reached the ninth edition (1881-1904). He has recently published *A Guide to Microscopy, Histology, and Embryology* (1904).

The Department of Geology

The geological department, like the university as a whole, has been developed gradually as the equipment, the means, the men, and the materials for instruction have been supplied, and these have come as the number of students has increased and the demand for specialization has become greater, as marking the growth of Cornell, grown from a small institution with undergraduate courses until it has become one of the foremost universities of America.

At the opening of the university the department of geology was entrusted to Professor Charles Fred Hartt, a native of Nova Scotia, with the title of professor of general, economic, and agricultural geology, and who began courses of lectures on general geology and instituted laboratory practice and excursions. He had graduated at Acadia College in 1860, and had spent three years as a special student of geology under Professor Agassiz in Cambridge. For one year (1864-65) he was an assistant on the geological survey of New Brunswick. He had been geologist of the Thayer expedition to Brazil in 1865-66. Here he found an entirely new field of investigation, not only in geology, but in ethnology, physical geography, and the languages, customs, and lore of the South American Indians. He published numerous papers which showed the versatility of his genius, not only in geology but in ethnology. He was unwearied in mastering the languages of the Indians, and in acquiring the hidden treasures of their popular legends. In the brief period of his connection with the university Professor Hartt stimulated the scientific interest of numerous students who have since become famous in their chosen fields. In order to return for further investigation in Brazil, he organized in 1870 a company of professors and students, who volunteered to join him in a new expedition to Brazil. Among those who accompanied him were Professor Prentiss for the study of the tropical flora, and Messrs. Derby, Branner, Rathbun, and Barnard. In university history this expedition bears the name of the "Morgan Expedition," in honor of the Hon. Edwin Barber Morgan of Aurora, who contributed a considerable sum to defray its cost. These enthusiastic scientists spent the summer and autumn of 1870 in Brazil and returned laden with valuable specimens to enrich the university museums. Three years later Professor Hartt was offered the position of director of the geological survey of Brazil, and received leave of absence to superintend that work. He filled the position from 1874-78, when he fell a sacrifice to his zeal for science on March 18, 1878.

A marble memorial tablet in the library of Acadia College, Wolfville, Nova Scotia, bears the following inscription to the first professor of geology at Cornell:

Charles Frederick Hartt, A. M.,
of the class of 1860.

A valued assistant
of Agassiz—Professor in Vassar College and
in Cornell University—Appointed by the
Emperor Dom Pedro II., in 1875, chief of the
Geological Survey of Brazil, in which service our
beloved " Fred " sacrificed his life.

Born at Fredericton, August 23, 1840.
Died at Rio Janeiro, March 18, 1878.
His remains were removed to Buffalo, June 7, 1883.

This tablet is placed here by his classmates, June, 1884.

Professor James Hall was announced as a non-resident lecturer, but did not take active part in the instruction of the students.

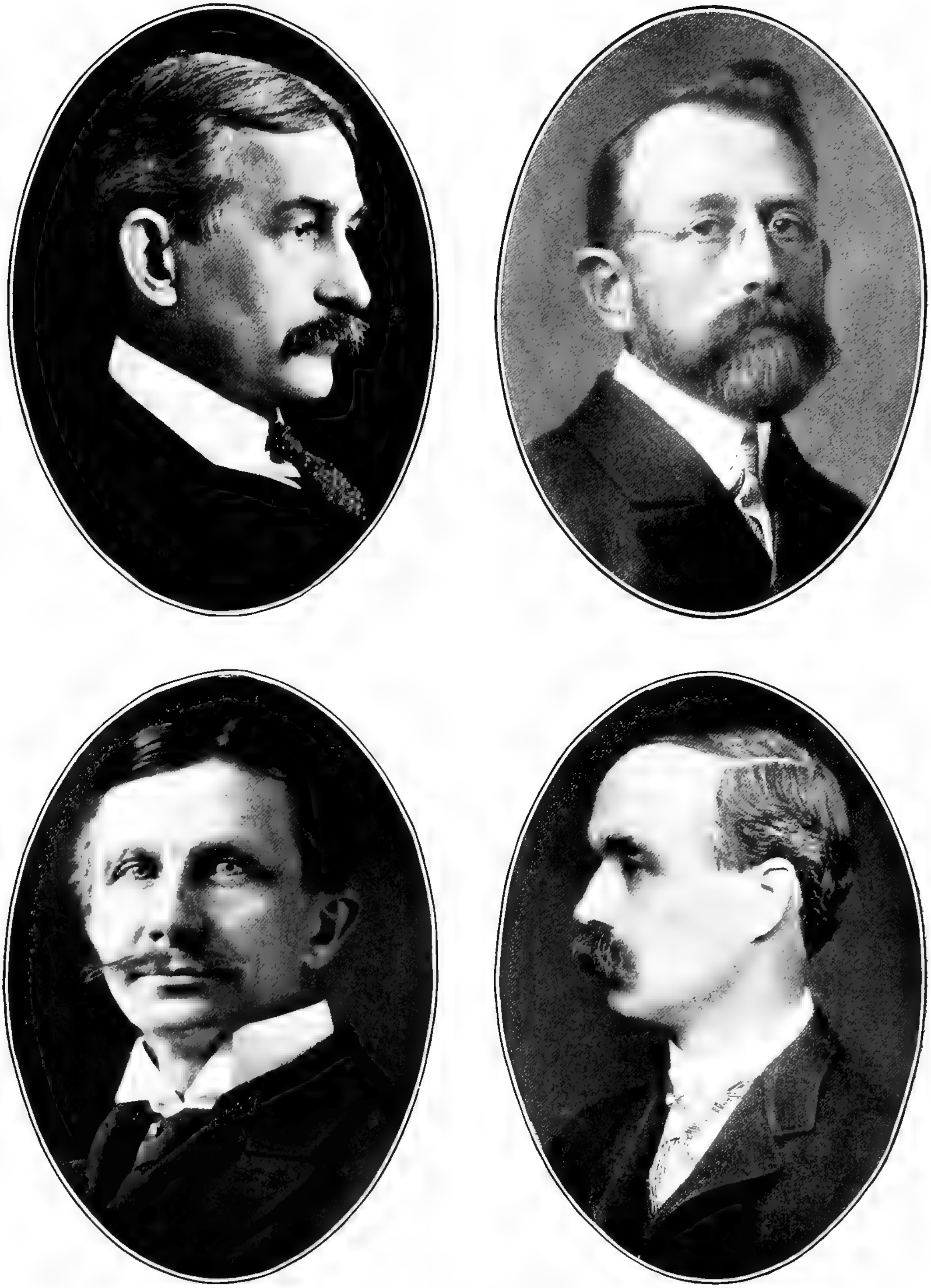
In the year 1869, Charles A. Schaeffer was appointed with the title of professor of analytical chemistry and mineralogy, and for several years thereafter the mineralogy and blowpipe analysis were conducted as branches of chemistry; but as time advanced, the physical and microscopic characters of minerals became the dominant means of their classification, and these subjects were transferred to the department of geology. For the first five years all the work of instruction in geology was performed by Professor Hartt, and his energy and enthusiasm developed like qualities in a number of earnest students of his department who have since become distinguished. Among those whose geological training was begun in Professor Hartt's laboratory may be mentioned John Casper Branner, who is famous for his investigations in Brazil, his survey of Arkansas, and who is now vice-president of Leland Stanford University; Theodore B. Comstock, afterward an instructor and assistant professor in the department, later president of the University of Arizona; Orville A. Derby, who, from an instructor in the department, has become the chief geographer and geologist of the state of São Paolo, Brazil; Herman Leroy Fairchild, the indefatigable secretary of the Geological Society of America, from near its beginning to the present time, and a glacial geologist of renown, who is now professor of geology in the University of Rochester; Richard Rathbun, who was one of the authors of the report on the expedition to the Amazonas and a prominent officer, now in charge of the National Museum at Washington; and Frederic W. Simonds, afterward an instructor in the department, and distinguished for his geological work in Arkansas and Texas, in both of which states he has held professional positions in geology.

Professor Hartt's companions in his two expeditions to South America shared his enthusiasm and have become eminent scientists. Their explorations in Brazil enabled them to gather valuable collections, and the results of their investigations in this new field at that time advanced science in various directions.

In 1896 Professor Tarr organized and conducted the Cornell expedition to Greenland, going as far north as latitude 74° with Peary in the steamer *Hope,* remaining there for the summer, studying the great Greenland ice-sheet at its margin, and returning in the autumn of that year. The party consisted of six men: Professors Tarr and Gill, and Messrs. E. M. Kindle, T. L. Watson, J. A. Bonsteel, and J. O. Martin. The expedition landed in Labrador and Baffin Land, as well as upon the Nugsuak peninsula, where the summer was chiefly spent. Much scientific information of high value was gained, valuable collections and photographs were brought back, and it is from this party that the Cornell Glacier received its name.

During his absence from the university, the work of the department was maintained by Orville A. Derby, Theodore B. Comstock, and Frederic W. Simonds. Professor Hartt was an incessant worker, a man of great force and energy, and a clear and inspiring lecturer. His interests were wide and, in his later studies, extended to art and language, to the literature of which he made important contributions in his reports on Brazil. He also enriched the university museum with valuable archæological material.

In 1875 Theodore B. Comstock was made assistant professor of general and economic geology, and was placed in charge of the department (1875-79). He was assisted by Frederic W. Simonds, as instructor in



GEOLOGY, FORESTRY AND BOTANY

Henry Shaler Williams
Bernhard Eduard Fernow

Ralph Stockman Tarr
George Francis Atkinson

zoölogy, paleontology, and geology. To Professor Comstock is due the credit of organizing a definite course in economic geology for architects and engineers, an elaborate syllabus of which he prepared for the use of his students. At the close of the year 1878 he resigned, and thereupon an entirely new set of officers of the department was appointed for 1879-80. Mr. Simonds, while in Ithaca, made valuable contributions to the geology of the region.

In 1879 Samuel Gardner Williams was appointed professor of general and economic geology, but spent his first year in Europe. During that period Henry Shaler Williams, with the title of assistant professor of geology, assisted by Newton Pratt Scudder, conducted the work of the department. Professor S. G. Williams elaborated the course in economic geology, and in the year 1886 published a text-book entitled *Applied Geology,* embracing the general field of his lectures. Professor Samuel Gardner Williams was an admirable teacher, and had had much experience in both the practice and administration of secondary education. The increasing interest in and demand for instruction in this field at the university led to his selection for the chair of pedagogy, to which he was transferred in 1886. With this change, Henry Shaler Williams was placed in full charge of the department with the title of professor of geology and paleontology, and James Furman Kemp appointed instructor in geology and paleontology. In 1888 the latter was made assistant professor of geology and mineralogy.

During the period 1880 to 1892 the development of the department was along two lines, paleontology and mineralogy. Instruction in economic geology and lithology of the previous years had been carried on separately from the blowpipe analysis and the mineralogy courses of the chemical department.

In the year 1888 James Furman Kemp began to develop the courses in petrography and mineralogy along microscopic lines, and thereafter economic geology was developed from the chemical and mineralogic rather than from the geologic point of view. This result was accomplished at first by J. F. Kemp and John Francis Williams, with the assistance of Instructors Marsters and Eakle of the geological department. By them thorough work in blowpipe analysis, the microscopic study of minerals, crystallography, and petrography were inaugurated, and the whole subject of mineralogy was transferred from the chemical to the geological department. The teaching of economic geology was placed by Professor Kemp on a broad scientific foundation of the mineralogical and chemical values of minerals, ores, geological substances, and their products. In the year 1891 Professor Kemp was called to Columbia College, first to assist, and finally to succeed his former teacher, Professor J. S. Newberry. With his withdrawal, John Francis Williams was elected to fill his place, with the title of assistant professor of geology and mineralogy. His broad training gave him special skill in the petrographic interpretation of rocks and minerals, and a high state of perfection in methods and instruction in crystallography and practical petrography was attained during his short occupation of the chair.

During this same period the paleontological branch of the department was enlarged under the administration of Professor Henry S. Williams, who instituted elaborate surveys extending from Ithaca as a center across Pennsylvania and into Ohio, and eastward across New York State to the Catskills. This work was still further expanded in connection with the United States Geological Survey, and extensive collections have become concentrated in the Devonian Laboratory of the United States Geological Survey, illustrating the geographical peculiarities of the Devonian faunas and formations from Maine to Arizona. In extending this paleontological work, great service was rendered by instructors and graduate students by the application of the methods to regions. In the paleozoic work Messrs. Prosser, White, Hill, VanIngen, Weller, Kindle, and Cleland are conspicuous; and for the cenozoic, Professor Harris has become a distinguished authority.

Upon the death of Assistant Professor John Francis Williams, during the year 1891-92, and, at its close, the resignation of Professor Henry S. Williams to accept a chair at Yale, Ralph Stockman Tarr was elected assistant professor of geology and placed in charge of the department, with Arthur Starr Eakle as assistant. This arrangement continued until 1894-95, when an enlargement of the department became possible.

Professor Tarr was appointed assistant professor of dynamic geology and physical geography, Dr. Adam Capen Gill was appointed assistant professor of mineralogy and petrography, and Mr. Gilbert Dennison Harris assistant professor of paleontology. This arrangement of work continued until 1894, Professor Tarr giving the courses in dynamic geology and physical geography, in which he had won so distinguished a reputation, Assistant Professor Gill those in mineralogy and petrography, and Assistant Professor Harris those in paleontology and stratigraphic geology. During this period the work of the summer school in geology had been widely extended through the efforts of Professor Tarr and Assistant Professor Harris. The latter had provided and equipped a boat to take his students along the shores of the lakes and the canals and rivers of the state in order to study the various geological formations. The attendance of students in geology and geography alone at the summer school of 1904 numbered eighty-eight students, mostly teachers.

The rapid growth in importance of the work in economic geology led in 1902 to the appointment of Dr. Heinrich Ries as instructor and later as assistant professor of economic geology (1898). Under Professor Tarr the following men have been assistants in the department: Stuart Weller, 1893-94; S. P. Carll, 1894-95; J. A. Bonsteel, 1895-98; J. O. Martin, 1899-1901; Frank Carney, 1901; R. H. Whitbeck, 1901; G. C. Matson, 1901-03; F. S. Mills, 1902-03; and since the fall of 1903, G. D. Hubbard, F. V. Emerson, and W. E. McCourt.

Professor Tarr is a graduate of the Lawrence Scientific School of Harvard University (B. S. 1892). Prior to his appointment at Cornell Professor Tarr had been assistant in the geological department at Harvard, assistant geologist on the Texas Geological Survey and on the United States Geological Survey, working in New England, New Jersey, and in various parts of the Rocky Mountain region. He is widely known as an author. His publications include text-books of geology, physical geography, and geography, and numerous scientific papers, including reports on the geology of the Cornell Greenland Expedition. He is associate editor of the *Journal of School Geography* and of the *Bulletin of the American Geographical Society.* Professor Tarr is at present engaged in an investigation of the glacial geology of Central New York for the United States Geological Survey.

Professor Harris is a graduate of Cornell, having received the degree of Ph. B. in 1886. In 1886-87 he was a graduate student at Cornell, and later assistant on the United States Geological Survey and the geological surveys of Texas and Arkansas. Since 1899 Professor

Harris has been state geologist of Louisiana, spending the time between Christmas and Easter in that state, and, with the exception of the year 1903, conducting a regular summer session of ten weeks in field geology and paleontology in the Helderberg Mountains and on Lake Champlain. This being primarily a course in the field, is best given during the summer vacation. It is generally attended by from twelve to twenty-seven students. Professor Harris has prepared reports on the tertiary geology of Texas and Arkansas, and two reports of the geological survey of Louisiana, besides numerous scientific contributions, mainly upon phases of tertiary invertebrate paleontology. He also edits and publishes the *Bulletin of American Paleontology.*

Professor Gill, a graduate of Amherst in 1884, and later a graduate student at Johns Hopkins and in Germany, received his Ph. D. at Munich in 1893, having studied petrography with Zirkel at Leipzig and crystallography with Groth at Munich. Professor Gill has made a number of scientific publications, including his *Tables for the Determination of Common Minerals.* He has in course of preparation a *Text-book of Crystallography,* and has for some years been engaged in important investigations in crystallography, mineralogy, and petrography.

Professor Ries received his Ph. B. from Columbia in 1892, A. M. in 1894, and Ph. D. in 1896, and pursued graduate studies in Berlin while holding the Barnard Fellowship from Columbia University. His special interest is in clay work, in which subject he is an expert, for the United States Geological Survey, and is often called upon in geological surveys to prepare reports on the clay resources of the states. Professor Ries has, however, written upon many other subjects in economic geology.

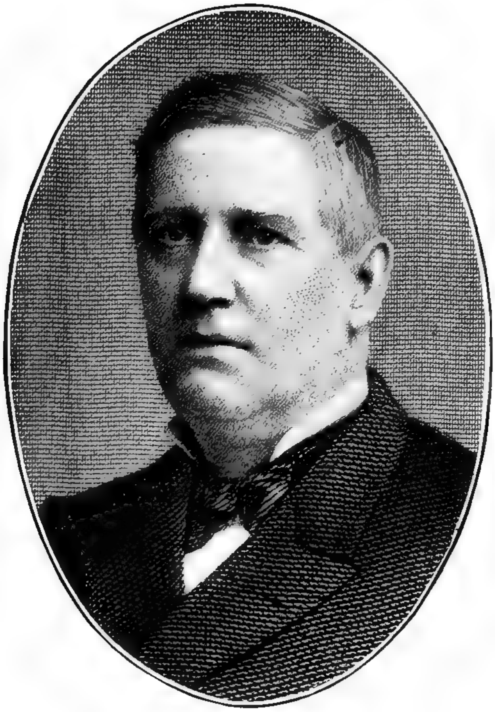
In addition to instructing during the regular college terms, Professor Tarr has taught for several summers in the summer session, and in 1903 organized the Cornell Summer School of Geography, whose aim is to offer scientific instruction for teachers of geography. Associated with him in this school are nine other teachers, offering twenty-one courses in the field of general geology, physical geography, general geography, and commercial geography. In 1903 there was an attendance of nearly ninety students, coming from seventeen states, and including superintendents, normal-school instructors and supervisors, high-school principals and science teachers, and grade teachers.

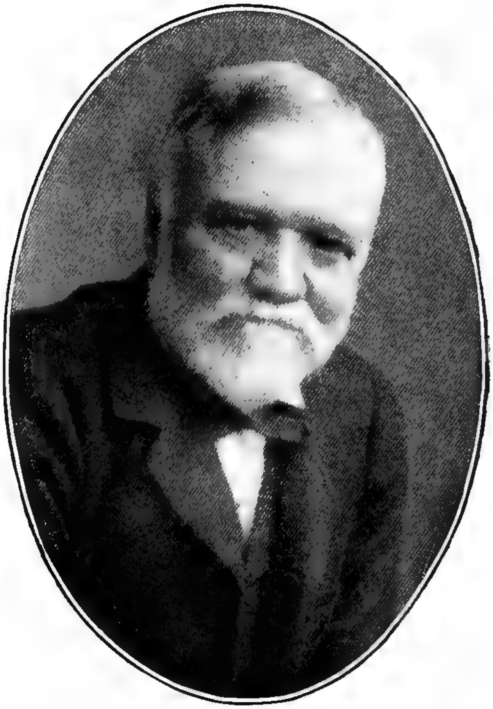
In the regular university curriculum for 1903-04 (not including the summer session) twenty-six courses were offered by the professor and three assistant professors of the geological department.

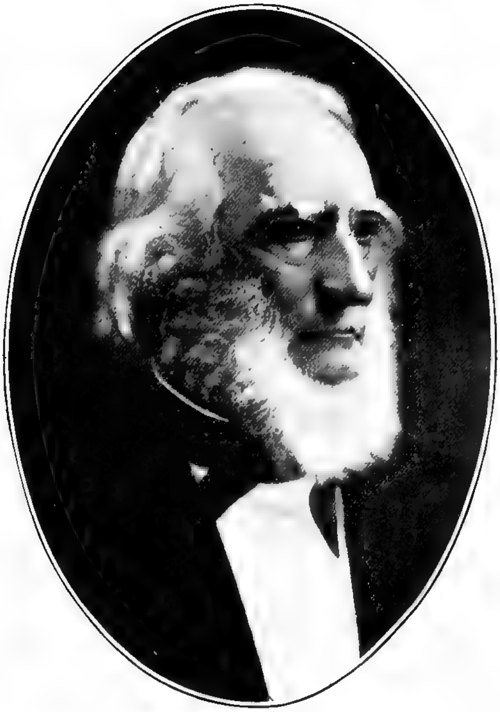
Four hundred and sixty students enrolled in these courses in geology in the year 1903-04. Many of these were students in arts who elected the subject, but students in the colleges of architecture, civil engineering, and agriculture have required courses in geology.

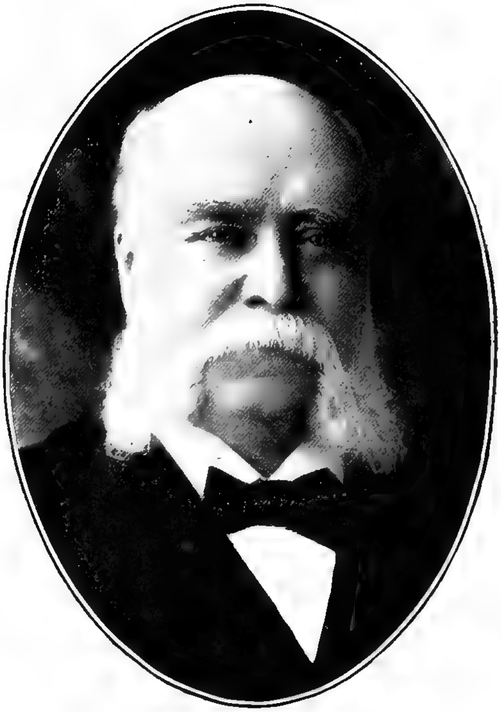
During this period the summer-school work has been rapidly developed through the activities of Professor Tarr and Assistant Professor Harris, a boat having been provided and equipped by the latter to take his field parties along the channels of the lakes, canals, and rivers of the state.

This system of subdivision of the work of the department continued until the year 1904, when Henry Shaler Williams was recalled from Yale to be head of the department and director of the museum. He reestablished at Cornell the now much enlarged Devonian Laboratory of the United States Geological Survey, which had been in his charge for several years. By his return also the university becomes the center of the areal mapping of the neighboring quadrangles for the









TRUSTEES

Alonzo B. Cornell (1865-1904)
Josiah Butler Williams (1865-1883)

Andrew Carnegie (since 1890)
Stewart Lyndon Woodford (since 1869)

government survey, which for several years has been conducted by him with the assistance of Edward M. Kindle, a graduate of Cornell in 1896.

During his previous association with the department, as well as later, Henry Shaler Williams has taken an active part in unifying the geologists of the country, in arousing American interest in work of foreign geologists, and in organizing the work and methods of research in this country. He was the youngest member of the American committee of the International Congress of Geologists, and for several years its secretary. Its report on the Devonian and Carboniferous periods was figured by him. He was the American representative on several of its standing committees, and was chosen first secretary of the congress at its session in Washington. He was one of the founders of the Geological Society of America, and through his influence its first meeting was held at Ithaca. Its *Bulletin* has reached its fourteenth volume. He published the first of the series of correlation papers of the United States Geological Survey, and was one of the seven members of the survey charged in 1902 with the important task of revising and preparing a set of rules for nomenclature and classification for the survey. It was by his motion that the congress undertook the preparation of the *Bibliographia Geologica,* which has already resulted in several large volumes at the hands of its able secretary, M. Margerie, of Paris. He was one of the original committee which has taken up the preparation of a *Palæotologica Universalis,* the second fascicle of which, with about fifty plates, has already been issued under the energetic secretaryship of M. D. P. Oehlert, of Laval.

He has been one of the associate editors of the *Journal of Geology,* which has reached its thirteenth volume, and upon going to Yale became for a time managing editor, and has since been an associate editor, of the *American Journal of Science.*

His work in connection with the United States Geological Survey, which began as early as 1880, has extended the knowledge of the Devonian formations and faunas, and has particularly been directed toward the development of methods of precision in the study of fossil faunas and their values in determining geological time.

He took an active part in founding and shaping the scientific honor society Sigma Xi, and through it has been instrumental in organizing and intensifying the interest in and the influence of scientific research as a field of university activity.

At the present time, the special laboratories for work in each of the four fields (mineralogy, paleontology, structural and economic geology, and physical geography) are well equipped, and adequate collections, charts, maps, and libraries have been provided for carrying on the instruction, while the wonderful rock exposures of Central New York furnish admirable facilities for original investigation, particularly in the branches of historical, structural, and paleontological geology.

The rate of increase in students taking geology during the past ten years has been far greater than the rate of growth of the university, and, as a result, the laboratories have become greatly overcrowded. All available space has been occupied, even to the extent of building laboratories in the basement and temporarily partitioning off rooms in the galleries of the museum. Not only are the rooms overcrowded, but many are totally unsuited to the purposes for which they are used, nor does it seem possible to adapt them to these needs without entire remodelling.

The collections and equipment of the department are as follows: In paleontology, aside from many smaller collections, there is the Jewett collection, purchased by Ezra Cornell at a cost of $10,000, and the remarkable Newcomb collection of recent shells, purchased at a cost of $13,000. Since the university is in the midst of a rich field of fossiliferous Devonian rocks, and as there has been a paleontologist in the department almost since the founding of the university, the collection of local fossils has become of great size and completeness.

In mineralogy and petrography also there are good collections, for, aside from the study series, there is the valuable Silliman collection, which is on exhibition in the museum. There is a petrographical collection of rocks from many states in the Union and some foreign countries, including rocks collected by Professor Gill in Germany, in Mexico, and in Greenland and Labrador; and there are over one thousand thin sections of rocks for microscopic study. Of late years, owing to the development of new methods in the study of minerals and rocks, the department of mineralogy needs much expensive apparatus, only a part of which is at present owned by the university.

In economic geology there are about twenty-five hundred specimens of useful minerals and rocks, including ores (iron, copper, gold, silver, lead, zinc, etc.), building-stones, coals, clays, cements, petroleum, etc., to which additions are being constantly made. There are also about fifteen hundred lantern slides and several hundred photographs. The department has also laboratories in which either chemical work or fire tests can be carried on, there being for the latter purpose two furnaces capable of generating 3,300° of heat Fahrenheit. These are useful for testing clays and building-stones, but the laboratory is especially well equipped for clay investigation.

In dynamic geology and physical geography there is a rather full study-collection of common rock-forming minerals and rocks and some geological maps. The collection of lantern slides for lectures, numbering over five thousand, is hardly equaled in the country, the gathering and selection of which has taken Professor Tarr over ten years. There are also over three thousand photographs and four thousand negatives, catalogued and arranged for use in illustrating various phases of geological and physiologic study. There are nearly four thousand maps, including all the topographic sheets of the United States Geological Survey, and many maps from the government surveys of Great Britain, France, Germany, Austria, Italy, and Switzerland. There are forty-five models representing in relief the continents, certain states, and various mountain, plain, and sea-coast phenomena.

In the fall of 1904 Professor H. S. Williams, who had gone to Yale in 1892, was appointed professor of geology, director of the museum, and head of the department, once more united.

Among the graduates who have pursued special courses in geology are:

NAME	DEGREES	YEAR AT CORNELL	PRESENT POSITION
George Hall Ashley	M. E., A. M., Ph. D.	'90	United States Geological Survey, and Professor, College of Charleston, S. C.
Irving Prescott Bishop	M. S.	'73–'75	Buffalo Normal School.
Jay Allan Bonsteel	B. S., Ph. D.	'96	U. S. Bureau of Soils, and Professor, Cornell University.
John Casper Branner	B. S., Ph. D., LL. D.	'74	Vice-president and Professor, Leland Stanford Jr. University.
Thomas Andrew Caine	A. B.	'01	U. S. Bureau of Soils.

NAME	DEGREES	YEAR AT CORNELL	PRESENT POSITION
Samuel Peaslee Carll	A. B.	'95	Oil Specialist.
Frank Carney	A. B.	'01	Assistant Principal, Ithaca High School, and Instructor, Cornell Summer Session.
Ermine Cowles Case	M. S.	'95	Milwaukee Normal School.
Herdman Fitzgerald Cleland	A. B., Ph. D.	'00–'01	Professor, Williams College.
Theodore Bryant Comstock	B. Agr., B. S., D. Sc.	'70	Mining Engineer.
Edgar Roscoe Cumings	A. B.	'97–'98	Instructor, Indiana State University.
Henry Platt Cushing	Ph. B., M. S.	'82	Professor, Western Reserve University.
Orville Adelbert Derby	B. S., M. S.	'73	Chief Geographer and Geologist, State of São Paulo, Brazil.
Arthur Starr Eakle	B. S.	'92	Instructor, University of California.
Herman Leroy Fairchild	B. S.	'74	Professor, Rochester University.
Louis Caryl Graton	A. B.	'00	U. S. Geological Survey.
Gilbert Dennison Harris	Ph. B.	'86	Professor Cornell University, and State Geologist, Louisiana.
Robert Thomas Hill	B. S.	'87	U. S. Geological Survey.
Joseph Austin Holmes	B. Agr.	'81	State Geologist, North Carolina, and Professor, North Carolina University.
Gilbert van Ingen	— —	'91–'92	Museum, Princeton University.
Edward Martin Kindle	M. S., Ph. D.	'96	U. S. Geological Survey.
William Lochhead	A. B., M. S.	'95	Professor, Ontario Agricultural College, Guelph, Ontario.
Vernon Freeman Marsters	A. B.	'88	Professor, Indiana State University.
George Curtis Martin	B. S., Ph. D.	'98	U. S. Geological Survey, Assistant Geologist, State of Maryland; Instructor, Johns Hopkins University.
James Otis Martin	B. Agr., A. M.	'99	U. S. Bureau of Soils.
George Charlton Matson	B S., A. M.	'03	Instructor, University of Illinois.
Fred North Meeker	A. B.	'02	U. S. Bureau of Soils.
Frank Smith Mills	A. B.	'02	Professor, St. Lawrence University.
Roscoe Blake Morton	B. S.	'99	Mining Engineer.
Joseph Nelson Nevius	— —	'90–'94	Mining Engineer.
Charles Smith Prosser	B. S., M. S.	'83	Professor, Indiana State University.
Richard Rathbun	M. D., D. Sc.	ex–'75	In charge U. S. National Museum.
Frederick William Simonds	B. S., M. S., Ph. D.. D. Sc.	'75	State Geologist of Texas; Professor, University of Texas.
Fred Douglass Smith	B. S.	'92	Mining Engineer.

NAME	DEGREES	YEAR AT CORNELL	PRESENT POSITION
George Thomas Surface .	B. S., M. S.	'99–'00	Professor, Emory and Henry College, Va.
Henry Ward Turner . .	— —	'74–'76–'82	U. S. Geological Survey.
Arthur Clifford Veatch . .	— —	ex–'03	U. S. Geological Survey.
Thomas Leonard Watson .	Ph. D.	'97	Professor, Denison University, Ohio.
Stuart Weller . . .	B. S.	'94	Professor, University of Chicago.
Ray Hughes Whitbeck . .	A. B.	'01	Trenton Normal School, and Instructor, Cornell Summer Session.
Charles David White . .	B. S.	'86	U. S. Geological Survey, and Smithsonian Institution.

CHAPTER II

THE COLLEGE OF LAW

A DEPARTMENT of law had been included by President White among the special departments recommended by him in his " Report on Organization " presented to the trustees in 1866. At no time during his administration, however, was it possible to realize this part of his plan. When he resigned in June, 1885, the university was for the first time beginning to enjoy the financial benefits of Mr. Cornell's and Mr. Sage's courageous management of its western lands, which, up to about that time, had been a burden and a drain upon its slender resources. With the sales of lands in 1881 and succeeding years, the income-bearing endowment was greatly increased; and by 1885 the income, while still not large, was sufficient to warrant the rapid development of the university in various directions.

In November, 1885, upon the initiative of President Adams, a committee, of which he was chairman, was appointed by the Board of Trustees to consider the desirability of the establishment of a department of law. The other members of the committee were Judge Douglass Boardman, Hon. Stewart L. Woodford, James F. Gluck, and George R. Williams. The report of this committee was presented in June, 1886. It showed the importance of legal education, the fact that the provisions then made for it in New York were not adequate, and especially that rural New York was but indifferently served, pointed out the favorable situation of Cornell University for this work, and that the financial condition of the university would warrant the undertaking. It is especially interesting to note in this report the statements that " there are at present no very conspicuous advantages for the most thorough study of the law between the banks of the Hudson and the Detroit River," and that " nearly as large a number of students in law schools from the state of New York, outside of the metropolis and its immediate suburbs, go to Ann Arbor as go to New York City." But the total number of students in law schools from New York, exclusive of New York City, Brooklyn, and Albany, was believed to be less than forty. The argument was therefore pressed that what may be called rural New York was inadequately provided with facilities for legal education.

The report was accepted at the meeting of the trustees in June, 1886, and its recommendations were unanimously adopted. The announcement was made that it was the purpose of the university to be in readiness for the admission of law students in the fall of 1887, and " to provide such facilities and opportunities for a legal education as will commend themselves to the most favorable judgment of the members of the profession."

The report of the special committee was followed in October, 1886, by a report of the executive committee dealing with the organization of the school. A course of two years was advised, although the committee indicated an opinion that if conditions would warrant, and especially if the rules for admission to the bar in New York did not require one year of study in an office,[1] a course of three or possibly four years would be preferred. There was not then a law school in the country requiring the A. B. degree for admission, and the committee regarded such a requirement as unwise. It

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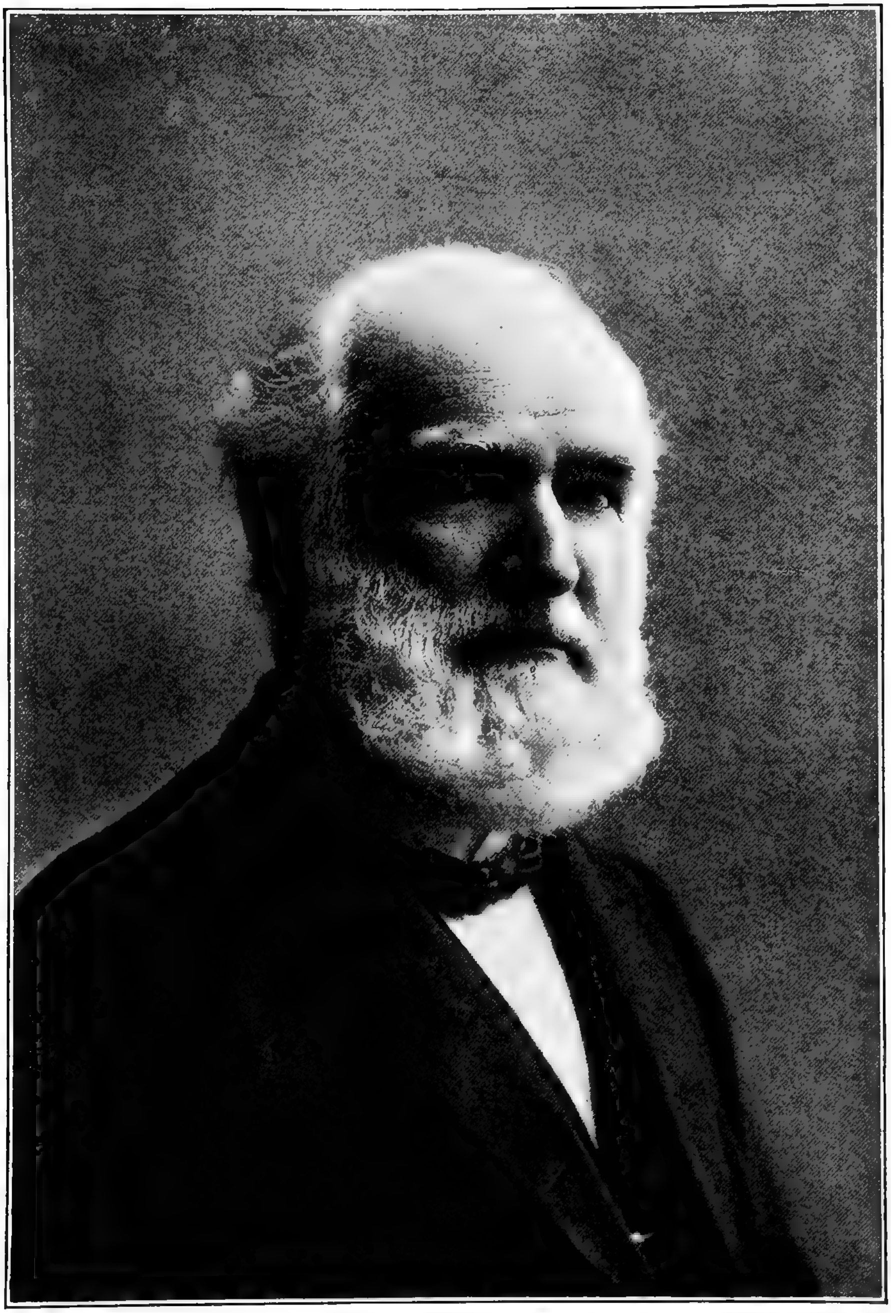
[1] This requirement has since been abolished.



DOUGLASS BOARDMAN

advised that the minimum requirement be a New York regents' academic diploma, which represented four years of high-school work, and was substantially equivalent to the requirements for admission to the scientific and technical courses of the university. It is noteworthy that this recommendation was not then adopted, and down to September, 1898, students were admitted upon a minimum requirement measured by the New York regents' law-student certificate, which then represented scarcely one year of high-school work, and was by subsequent amendments to the rules of the court raised to about two years of high-school work. Since 1898 the minimum requirement has been a full high-school course, measured approximately by the regents' academic diploma.

The first resident faculty chosen on March 9, 1887, to begin the work of instruction in the school, consisted of Hon. Douglass Boardman, dean; Harry B. Hutchins, secretary; Charles A. Collin, and Francis M. Burdick. In addition, Professor Moses Coit Tyler and Professor Herbert Tuttle, of the general university faculty, were included also in the law faculty, giving instruction in American constitutional history and law, and in English constitutional history and law, respectively.

Judge Boardman was a justice of the Supreme Court of the state of New York, and his part in the work of instruction consisted of a course of lectures upon "The Preparation, Trial, and Argument of Cases." He accepted the deanship with reluctance, and only because it seemed at that time advisable to have at the head of the school a New York jurist who was widely and favorably known to the profession. He died September 5, 1891, and Hon. Francis M. Finch of the New York Court of Appeals was appointed his successor, with Professor Hutchins as associate dean in charge of the school. Judge Boardman's interest in the school was always constant and helpful. Besides making large gifts of books, he founded the present Boardman Senior Prize Scholarship, which was originally a prize for the best graduating thesis. Judge Finch in his address presenting the Moak Library in behalf of the widow and daughter of Judge Boardman, spoke thus of the first dean:

"I have spoken of him before. It is fitting that I speak of him again. Though he took but a moderate part in the routine of instruction, what he did was, like all he did, thorough and accurate and sound; and beyond that his interest in the work and prosperity of the school was unsleeping and untiring. I am not permitted to say how often in his quiet and reticent way he bore burdens for which his resources were insufficient, nor how well I know that in that far land where he awaits us in our turn, he looks down upon this day's work with pleased approval. A sound and solid lawyer, a patient and impartial and thoroughly upright judge, careful and wise in all the business of life, a truthful and faithful friend, with courage if need be to warn or reprove, steadfast and firm and farsighted in the councils of the university, modest to a fault, and always underrating an ability which never failed or bent under any responsibility, he left us when it was hard to spare his useful and generous service, but comes back to us in those whom he left behind, and who have taken up his work in love and respect for his memory."

Professor Hutchins came from the Michigan Law School, where he had been a professor for three years. While his title at the Cornell Law School was that of secretary, he was in fact the resident administrative officer, and his title was later changed to that of associate dean. For the first eight years of its history, the school was under his guidance, and upon him fell the chief burdens of organization and administration. Later he went back to Michigan as dean.

Professor Collin came directly from practice to teaching after a professional career of sixteen years, and Professor Burdick came from Hamilton College, where he had been engaged in teaching law for five years subsequent to a professional career of ten years.

In addition to the resident faculty, there were several non-resident lecturers. Courses were given during the first year by Judge Francis M. Finch, Hon. Daniel H. Chamberlain, William F. Cogswell, George S. Potter, Benjamin F. Thurston, Goodwin Brown, and Theodore Bacon.

The home of the school during the first five years of its existence was in the upper story of Morrill Hall. Its library consisted of the Merritt King collection, purchased by the trustees in January, 1886, numbering about 4,000 volumes. Judge Boardman added by way of gift about 750 volumes, and annual purchases brought the total up to over 9,000 by June, 1892.

The method of instruction during the early years was mainly by text-book and lectures, with some selected cases, used, however, rather by way of illustration. It was not until about 1893 that courses based entirely upon selected cases were introduced. Since that time, the case method has increased in popularity, until now practically all the work of the school is based upon it, and several case books have been prepared especially for use at Cornell.

From the beginning, the school has exacted more hours of class-room work than is usual in law schools. During the first year, the junior class was required to carry fifteen hours, and the senior class sixteen; and since that time, the work has been fourteen or fifteen hours per week for each class. In the fall of 1889, a third-year graduate course was introduced, and it was continued until the regular third year was required of all students in 1897.

In his report for 1891-92, Associate Dean Hutchins says:

"The beginning of the school of law was a modest one. There was no formal opening. Three professors and about fifty students met in a small lecture room in the fourth story of Morrill Hall, September 26, 1887, and inaugurated the work of the new department. . . . The rooms assigned to the school were inconveniently located, poorly ventilated, and in many ways inadequate. But they were the only rooms to be had. The school prospered, however, notwithstanding its lack of material equipment. The faculty were a unit as to policy and methods. Their whole energy was given to the enterprise, and their efforts were appreciated and seconded by enthusiastic and devoted students. The first five years in the history of this department will always stand out as a distinct period, not only by reason of the fact that such naturally would be the case, but also, and chiefly, because its history during that time shows a remarkable growth and development under adverse circumstances."

In 1891 the overcrowded condition of the quarters in Morrill Hall led the trustees to consider the matter of a new home for the school. The result was the erection at a cost of $110,000 of Boardman Hall, which, since 1892, has been exclusively occupied by the law school. This building is situated directly opposite the general library building, and is a three-story structure 202 by 58 feet, built of Cleveland sandstone, with interior finishings of oak, and is practically fireproof. On the first floor are three commodious lecture rooms and necessary cloak rooms; on the second floor are the offices of the several professors and rooms for the use of the club courts; on the third floor are the library

BOARDMAN HALL

rooms, with accommodations for forty thousand volumes and three hundred readers. The building was first occupied in the fall of 1892, and was formally dedicated February 14, 1893. The ceremonies consisted of the presentation of the Moak law library by the Hon. Francis Miles Finch in behalf of the donors, Mrs. A. M. Boardman and Mrs. Ellen D. Williams, and the acceptance of the gift by President Schurman, and an address by the Hon. Charles Andrews, Chief Judge of the New York Court of Appeals. It was at this time that the name "Boardman Hall" was formally announced, in honor of the first dean of the school, Judge Douglass Boardman.

An interesting feature of the new building was the procuring of numerous portraits to adorn it. The first of these were six oil portraits presented by ex-President White. The subjects of these portraits are Hugo Grotius, Christian Tomasius, Lord Mansfield, Lord Camden, Chief Justice Marshall, and Chancellor Kent. An oil portrait of Chief Justice Waite was presented by the artist, Mr. Whitlock, one of Judge Boardman was presented by Mrs. Boardman, and one of Judge Finch was purchased for the school by the trustees and was hung on his seventy-fifth birthday, June 9, 1902, at which time appropriate exercises in his honor were held in Boardman Hall. In addition to these, nearly fifty fine engraved portraits of noted jurists have been hung in the lecture rooms, besides a full set of portraits of the justices of the Supreme Court of the United States. These have all been gifts from friends of the school, many being given by the librarian, Mr. Fraser, and some as class memorials by the classes of 1903 and 1904.

When the rare and valuable law library of Nathaniel C. Moak of Albany was by his death thrown upon the market, its purchase was authorized by the widow and daughter of Judge Boardman, and it was presented to the school at the formal dedication of Boardman Hall. The donors stated the object of the gift to be " to make good lawyers of noble men." This sentiment might well be inscribed upon the alcoves containing the splendid library. This collection numbered 12,510 volumes and brought the total of the library to about 22,000 volumes. It has been increased by succeeding purchases until in June, 1904, the library numbered 32,840 volumes. In 1893 Mr. A. H. R. Fraser became librarian of the law library, and he has since administered it with rare ability. The library now contains, beside the usual complement of text-books, the reports of nearly every court in the world whose proceedings are conducted in the English language, and has, besides, a practically complete set of legal periodicals in English.

Down to 1897, the course of study leading to the LL. B. degree was two years; and from 1889 to 1898 there was a third graduate year leading to the degree of LL. M. In the fall of 1897, the three-year course began, and since that date has been required of all candidates for the degree. Beginning in 1891, juniors and seniors in the Academic Department were allowed to elect studies in law equal to one year of law work, and this system is still in force. Beginning with 1893, a summer term of the law school was conducted, and this was carried on until 1898, after which it was discontinued.

The increase in the length of the course (1897) and in the requirements for admission to a full high-school course (1898) resulted in a loss of 50 per cent. in the entering class of September, 1898, as compared with the entering class of September, 1896. The present attendance is now practically as great as before these changes were made. The following table will give the details of attendance and graduation since the organization of the school, omitting the summer law students:

REGISTRATION IN THE COLLEGE OF LAW.

Year	Students Registered as Law Students						Students Arts, etc.	Total receiving Instruction	Degrees	
	Graduates	Seniors	Juniors	1st Year	Special	Total			LL. B.	LL. M.
1887–88		11		44		55		55	9	
1888–89		41		44		85		85	36	
1889–90	9	37		60		106		106	32	7
1890–91	9	50		63		122		122	44	5
1891–92	5	47		71		123	29	152	37	3
1892–93	14	65		97		176	28	204	62	11
1893–94	17	76		104		197	32	229	65	10
1894–95	13	92		85		190	36	226	76	8
1895–96	11	78		119		208	44	252	61	4
1896–97	10	99		125	18	252	55	307	81	7
1897–98	7	112	18	105*	12	254	42	296	105	5
1898–99	8	26	74	62†	4	174	50	224	25	
1899–1900		52	61	61	4	178	66	244	52	
1900–01		45	52	78	7	182	66	248	44	
1901–02		34	71	86	7	198	61	259	32	
1902–03		48	77	95	5	225	76	301	45	
1903–04		53	76	109	3	241	67	308	49	

* The first class to enter a three-year course.
† The first class to enter on full high-school requirement.

The first change in the faculty occurred in June, 1891, when Professor Burdick accepted a call to the Columbia Law School and Professor Charles E. Hughes was appointed as his successor. Professor Hughes came from an active practice in New York City, and was induced to return to it two years later. His success as a teacher was instant and brilliant. In 1891 Professor William A. Finch, '81, who had been for some years in practice, was appointed as an additional member of the faculty, thus increasing the resident teaching staff to four members. Professor Finch was the first Cornell graduate to occupy a chair in the law school. The vacancy created by the retirement of Professor Hughes in 1893 was filled by the appointment of Professor Ernest W. Huffcut, '84 (law '88). Professor Huffcut was the first graduate of the Cornell Law School to become a member of its faculty.

In 1895 the faculty suffered the loss of two of its members who had been with the school from the beginning. Professor Hutchins resigned in order to accept the deanship of the law department of the University of Michigan, and Professor Collin resigned in order to engage in practice in New York City. The vacancies thus created were filled by the appointments of Professor Cuthbert W. Pound, a former student at Cornell, who was at the time of his appointment a member of the senate of New York and an active practitioner, and of Professor Henry W. Hardon, who came from an active practice in New York City. Professor Hardon remained but one year, when he resigned to accept a professorship in the Columbia Law School, and was succeeded by Professor Edwin H. Woodruff, '88, who came from Stanford University, where he had been engaged in law teaching.

In 1898 Professor Henry S. Redfield, who had been in practice nearly twenty years, was appointed an additional member of the faculty in charge of the work in civil procedure, thus increasing the resident teaching staff to five members. In 1899 Frederick D. Colson, '97, was appointed instructor in procedure to assist Professor Redfield. The appointment of two teachers of procedure marked an important development in the work of the school. After the Court of Appeals had abolished the rule requiring a law student to spend one year in an office, most students went directly from the law school into practice without serving the preliminary clerkship. This made it necessary for the law school to provide instruction in pleading and practice, which formerly the student had obtained

COLLEGE OF LAW

Ernest Wilson Huffcut

Cuthbert Winfred Pound (1895-1904)

William Albert Finch

during his law office clerkship. The work of the department was organized with a view to duplicating so far as possible the work of a busy law office, but to do so by a systematic development of the whole field of practice. The preparation of pleadings, and the conduct of a case from service of summons to entry of judgment, are frequently required of all members of the school. In 1901 Professor Redfield, who had successfully organized this work, resigned to accept a similar chair in the Columbia Law School, and was succeeded by Professor Frank Irvine, '80, who had been for six years a judge of the highest court of Nebraska, besides having had a considerable experience as a practitioner and trial judge.

In June, 1904, Professor Pound, who had served for nine years with great success, resigned his chair in order to return to active practice, and was succeeded by Professor William L. Drew, who had been a teacher of law at the University of Wisconsin, and later at the University of Illinois.

In addition to the regular staff, the following have served short terms as acting professors during the absence or illness of some member of the faculty: Charles R. Pratt, Jared T. Newman, Charles H. Blood. Mr. Newman and Judge Blood are both graduates of Cornell and in practice in Ithaca. Mr. Blood is now County Judge of Tompkins County.

Judge Finch, although connected with the school as lecturer and dean, was not a resident member of the faculty until January 1, 1896, when he retired from the Court of Appeals after a service of over fifteen years upon that bench. Judge Finch has been in close touch with the university from its foundation, first as legal adviser of the founder, and as trustee, and later as lecturer, dean, and professor in the law school. His interest in the school has always been keen and constant, and he has contributed in no small degree to its success. Since 1896 he has delivered annually a course of lectures upon the History and Evolution of Law, and upon the Statute of Frauds, and has given a course of informal talks upon Legal Ethics and the Preparation and Trial of Causes. In June, 1903, he retired, and is now professor emeritus. At the exercises held in honor of his seventy-fifth birthday, the following remarks were made by Professor Huffcut, then secretary of the College of Law, and later dean:

" Thirty-four years ago next October he stood near this spot among the little group of courageous men who then opened wide for the first time the doors of Cornell University. On that occasion he spoke in behalf of the gentle and gracious lady to whose thoughtfulness we owe the chime of bells now hung in our library tower. From the first he had been the counselor of the founder and had shared with him his hopes, and borne with him his trials. He was closely united by ties of college and fraternity with the first president. He was the friend of the second founder. From the first conception of the university to this day he has been intimately in touch with its growth and progress—as a trustee from 1865 until his judicial duties led to his retirement in 1882, as a lecturer in the School of Law from its foundation in 1887, and as dean of the faculty since 1892. We have laid here large claims to his time and thought, and have always found a ready and generous response.

" But even larger claims have been made upon him by the state. For fifteen and a half years—from June 1, 1880, to December 31, 1895—he sat as a member of the court of last resort in the most populous and wealthiest English-speaking commonwealth outside of England herself. . . . . Probably over 8,000 cases were argued before the court during the period that Judge

Finch sat upon the bench. While he participated in the decision of most of these, upward of 1,150 were especially assigned to him for the formulation of the opinion. In these cases he wrote over 750 opinions, the remaining 400 cases being decided upon his advice without opinions. These opinions are scattered along the highway of our law from Volume 81 to Volume 148 of the Reports of our Court of Appeals.

" Many of these opinions have already become thoroughly familiar to all students of the law. It is doubtful whether any living judge is so largely represented in the selections of cases reprinted for the use of law schools. Some of the opinions have already taken rank among the ' leading cases ' of the law, to be hereafter the landmarks from which men shall measure the true course and direction of our jurisprudence. . . . . What distinguishes them all is the dramatic marshaling of the facts, the lucidity and logic of the reasoning, the soundness of the legal deductions, and the surpassing excellence of the literary form.

" Of the rare literary quality of these opinions I need hardly speak in this presence. All who hear me know the accuracy and felicity of diction, the charm and picturesqueness of illustration, the sinewy strength and mobility of style, that characterize the writings of our illustrious friend. If one were called upon to name three judges who have most perfectly embodied sound law in strong and beautiful English, he might name Sir George Jessel or Lord Bowen or Mr. Justice Bradley, or possibly one or two others, but he certainly must name Francis M. Finch as one of the trio. It is not too much to say that had Judge Finch not been so scrupulously faithful to his jealous mistress, the Law, who exacts as the price of her favors the fullest measure of devotion, he might easily have taken a place in American letters comparable to that occupied by James Russell Lowell. Who that has read the exquisite verses which he has given reluctantly to the world, has not felt the thrill that is the involuntary homage paid to the true poet! Who could read the address delivered upon this hillside thirty-four years ago in presenting in behalf of Jennie McGraw the chime of bells that calls us to our daily task, or the memorial address upon Ezra Cornell, or the anniversary address upon John Marshall, or any one of the too infrequent addresses he has delivered, without recognizing the indefinable but convincing and authentic touch of the perfect master of the art of expression?

"All this accumulated learning and experience of more than fifty years at the bar and on the bench, all this exquisite literary power, he has turned in these latter days to the service of our school, and particularly to the preparation of his lectures on the History and Evolution of the Law. When these lectures shall claim, as they surely must some day, a wider audience than these halls can furnish, they are certain to take their place in the foremost rank of legal scholarship and of permanent American literature.

"As lawyer, judge, and teacher, as scholar, poet, and man of letters, he whom we delight to honor to-day has occupied a wide field of interests and has adorned and elevated every vocation and every avocation that he has followed. It is our greatest pride that for the past six years he has belonged peculiarly to us—not having disdained, after bearing the highest judicial honors, to share with us the daily work of the teacher. In the plenitude of his powers and honors he has come among us, the wise counsellor, the eloquent and inspiring teacher, the generous and-open minded friend."

The resident faculty now consists of Judge Finch, professor emeritus; Professors Huffcut, W. A. Finch, Woodruff, Irvine, Drew, and Instructor Colson. The

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Edwin Hamlin Woodruff

Frank Irvine

William Lincoln Drew

regular non-resident lecturers are Alfred C. Coxe, United States Circuit Judge, who lectures upon the Law of Shipping and Admiralty; Albert H. Walker of the New York bar, who lectures upon the Patent Laws of the United States; and Royal A. Gunnison of the Binghamton bar, who lectures upon the United States Bankruptcy Act.

Among the non-resident lecturers since the organization of the school have been the following: F. M. Finch, Daniel H. Chamberlain, William F. Coggswell, Theodore Bacon, George S. Potter, Benjamin F. Thurston, Albert H. Walker, Marshall D. Ewell, Orlow D. Chapman, Goodwin Brown, Alfred C. Coxe, John Ordronaux, Irving G. Vann, Irving Browne, J. Newton Fiero, Royal A. Gunnison.

Judge Douglass Boardman was the first dean of the school, and served from 1887 until his death in 1891. Judge Francis M. Finch was dean from 1892 to 1903. Since that date Professor Ernest W. Huffcut has been dean. Professor Harry B. Hutchins was resident administrative officer from 1887 to 1895. His title at first was secretary, but in 1892 this was changed to associate dean. Professor William A. Finch was secretary, assisting the dean, from 1895 to 1902.

Of those who have been members of the faculty, the following are graduates or former students of Cornell: W. A. Finch, '81, Frank Irvine, '80, E. W. Huffcut, '84, Cuthbert W. Pound, Sp. '84, E. H. Woodruff, '88, F. D. Colson, '97. Professors Huffcut and Woodruff were members of the first law class, graduated in 1888. Mr. Colson took his law degree in 1898, and Mr. Gunnison in 1896.

Other graduates and former students of the school who have engaged in teaching elsewhere are J. P. Harrold, '93, E. J. Northrup, '94, F. C. Woodward, '94, E. G. Lorenzen, '99, and H. M. Bellinger, Jr.

Among the graduates who have occupied places upon the bench and in the public service are the following: George McCann, '88, County Judge, Chemung County, N. Y.; Robert S. Parsons, '89, County Judge, Broome County, N. Y.; Sanford W. Smith, '89, County Judge, Columbia County, N. Y.; Louis W. Marcus, '89, Surrogate, Erie County, N. Y.; Charles H. Blood, '90, County Judge, Tompkins County, N. Y.; George C. Baker, '89, Deputy Attorney General, New York; E. D. Warner, '89, Deputy Attorney General, New York; George W. Schurman, '93, Assistant District Attorney, New York County; Frank G. Kelsey, '94, District Attorney, Montgomery County, N. Y.; Willard M. Kent, '98, District Attorney, Tompkins County, N. Y.; Carl M. Johanson, '92, formerly United States District Attorney, Alaska; John T. Morrison, '90, Governor of Idaho. The following have been members of the New York State Senate: John Ford, '90, S. S. Slater, '94. The following have been members of the New York Assembly: J. T. Rogers,'93, Edward C. Dowling, '91, Edward R. O'Malley, '91, D. W. Moran, '92, Sherman Moreland, '94, John C. Evans, '98, W. D. Cunningham, '00. W. D. Kelley, '00, has been a member of the New Jersey Legislature.

In 1896, upon the reorganization of the faculties of the university and the organization of separate college faculties, the name was changed from School of Law to College of Law, in conformity to similar changes throughout the university. Previous to this time, the law faculty had been the only independent professional faculty in the university. It now retains many of its independent powers, but its members are also members of the general university faculty.

Dean Huffcut has published an edition of Anson on *Contracts* (1895), *American Cases on Contract,* with Professor E. H. Woodruff (1894), second edition

(1900), *The Law of Agency* (1895), second edition (1901), *Cases on Agency* (1896), and *Law of Negotiable Instruments* (1898).

Professor E. H. Woodruff has published *American Cases on Contract,* with Professor E. W. Huffcut (1894), second edition (1900), *Cases on Domestic Relations, and the Law of Persons* (1897), *Introduction to the Study of Law* (1898), and *Cases on Insurance* (1900).

Professor W. A. Finch has published *Cases on the Law of Property in Land* (1898), second edition (1904).

CHAPTER III

CORNELL UNIVERSITY MEDICAL COLLEGE IN NEW YORK CITY

EARLY in the history of the university, propositions were made for the establishment of professional schools. At the fourth meeting of the Board of Trustees, held in Ithaca, October 21, 1866, a communication was presented from certain prominent physicians in New York proposing the organization of a medical department of the university, to be located in that city. This application was referred to a committee of the trustees to examine and report. This report was presented on the 13th of February, 1867. The committee decided that the establishment of a medical department in Ithaca was not at that time desirable, on account of the impossibility of combining theoretical and clinical instruction successfully. The committee were, however, of the opinion that a medical school should be established in connection with the university, and that its location should be in the city of New York. As the gentlemen who presented this application were members of the homeopathic school, the question of the recognition of a body differing in theory from the regular school of medical science had to be considered. It was recognized that in the essential features, the science of medicine as taught in the two schools was alike, viz., in anatomy, physiology, chemistry, surgery, toxicology, and materia medica, but that in the department of therapeutics there was an essential difference. In view of the fact that schools of medicine representing the es-

CORNELL UNIVERSITY MEDICAL COLLEGE, NEW YORK, N. Y.

tablished practice were attached to several existing colleges, the committee felt that the science of medicine as represented by the homeopathic school should receive favorable consideration. It was proposed, therefore, that the board should accept the proposition of the physicians who had presented the memorial, and the details of the arrangement of the proposed school should be referred to a committee, who should be empowered to confer with the applicants upon the following basis: First, that the professors of the medical school should be appointed by the trustees on the recommendation and nomination of the New York State Homeopathic Medical Society, it being understood that the trustees would not withhold their assent from any nominatioin upon any other grounds than want of high professional standing, or of personal character in the nominee. The university reserved the right, in order to avoid any charge of partiality to either school, to appoint in the proposed school professors of allopathic and eclectic therapeutics, whenever they should think proper to do so, who should enjoy all privileges of the regular professor of therapeutics, or to establish a department under the charge of allopathic professors. Students graduating should receive their degree without any reference to the school in which they desired to practice. The university reserved the right to impart instruction in medicine at Ithaca to any degree, and in any manner thought advisable, and the university was not to be responsible for the financial support of the proposed school.

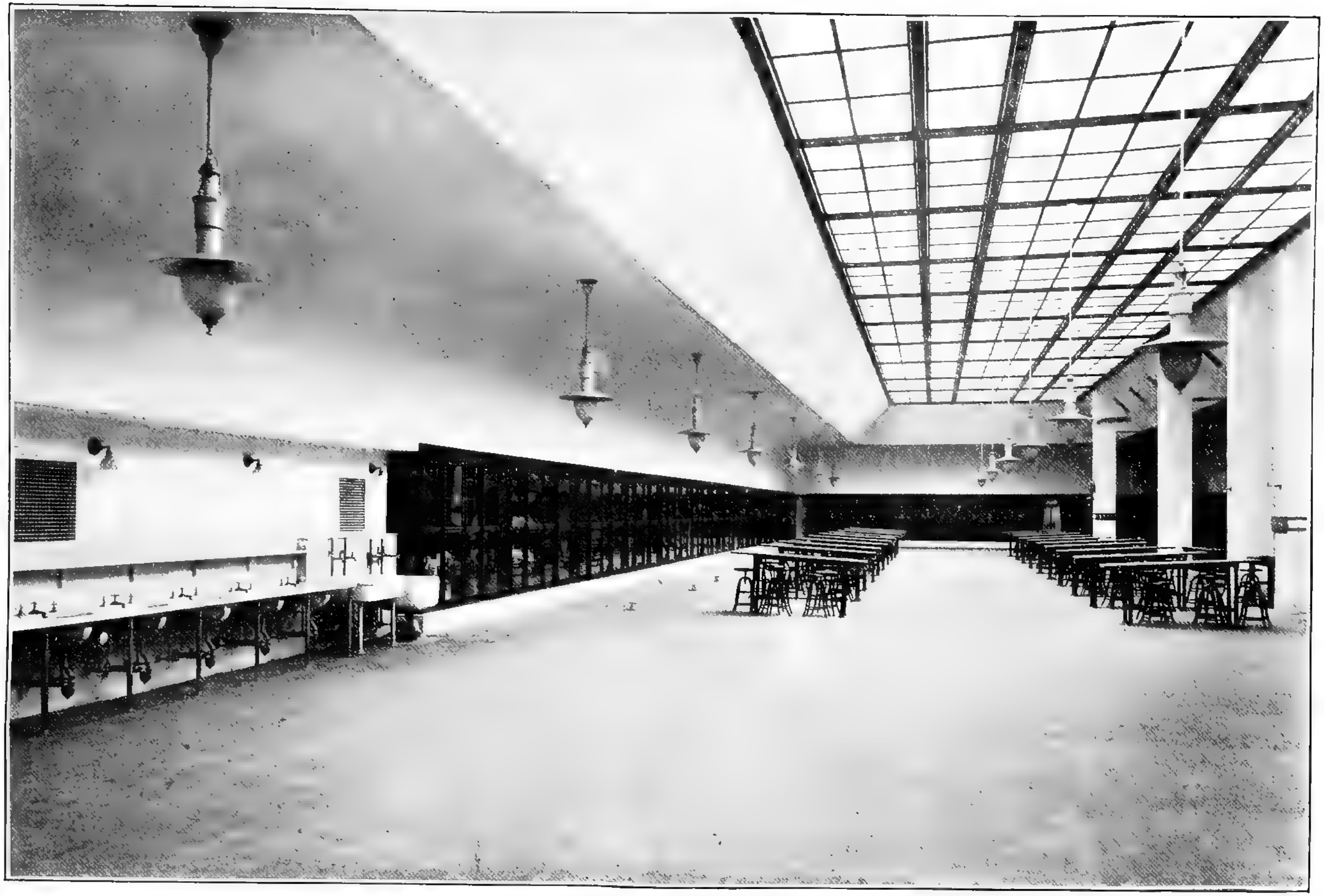
At the same meeting, a memorial was presented from a committee of the Congregational State Association, consisting of the Rev. Drs. J. Douglas and Joseph Thompson of New York, and W. A. Budington of Brooklyn, acting in behalf of the association, which asked the board to approve a plan to endow certain professorships, which could not be deemed denominational. It was proposed to establish a theological seminary in connection with the university. Halls or colleges for theological study have been established in connection with the university of Oxford, like Mansfield College, and with Harvard University, which, in addition to the Harvard Divinity School, containing professorships filled by eminent scholars of various denominations, has, in its immediate vicinity, the Episcopal Theological School, to whose students certain privileges of attendance at lectures and in the use of the university library are extended. The attitude of the governing boards at Harvard has always been favorable to the establishment of such schools in its vicinity. These separate colleges constitute together one center of learning. President Eliot has sought with wise liberality to enlarge the Harvard Divinity School, so that it shall represent in its broadest sense the scientific study of Oriental languages, ecclesiastical history, and theology. The report of the committee of the trustees of Cornell University held that it would be inexpedient to furnish facilities for the use of lecture rooms, or dormitory accommodations for any such school. They were willing that such a seminary should be established in Ithaca, and would welcome similar institutions by other denominations. They placed on record the statement that "we value any institution which will bring earnest men of scholarship and culture near to the university. We, therefore, recommend that university statutes be passed, admitting theological students to the lecture rooms and libraries on the same easy terms required of resident graduates of the university itself; and secondly, that every privilege of the university regarding lectures or library be extended to the faculty of any theological institution established in Ithaca, which is extended to the faculty of the university.'' Difficulties seem to have arisen in the execution of both these plans. In March, 1873, an additional effort was made by the physicians in New York to secure the establishment of a medical school in that city, constituting a part of this university. It was believed by those who presented the memorial that a sufficient sum would be immediately available to erect a building and supply its equipment, and also that a faculty of great eminence could be at once secured. This application, as presented, does not seem to have been considered favorably. The school, as proposed, was to contain lecturers representing various theories or views of medical science. It was believed that the inability of the university to provide certain important chairs of instruction made it inexpedient to attempt to found a medical school at a distance, whose administration would necessarily present difficulties, and possibly complications. A third effort to establish a medical department in connection with the university was made in 1887, when, at the meeting of the trustees of June 6, a committee was appointed to consider the desirability of taking preliminary measures for the establishment of a medical department, either independently or by arrangement with some existing institution. Certain propositions had been presented by those interested in the Graduate School of Medicine in New York, looking to its incorporation as a part of the university. The question of constituting Bellevue Medical College a part of the university was agitated, and a committee appointed to consider the subject, February 23, 1892. No final agreement was reached in the case of either of these applications. For many years there has existed in connection with this university what has been termed a medical preparatory course, which, under the efficient direction of Dr. Wilder, imparted valuable instruction in comparative and human anatomy and physiology, also in microscopy and biology. Many graduates of this school have attained the highest eminence in their profession. In a single year four pupils received the highest recognition of scholarship, upon graduating from as many different medical schools. The subject of establishing a medical school in connection with the university in Ithaca has appealed strongly to the trustees. They have recognized the necessity of securing in advance an adequate endowment for its support, as well as the establishment of hospitals or wards in the vicinity of the university, which should afford the necessary clinical and hospital practice. The establishment of such a school must be regarded as an event of a not remote future.

On the 7th of March, 1887, the trustees decided to establish a school of pharmacy, to be open for the admission of students at the beginning of the fall term of that year. It was proposed to found a course of study of equal rank in point of thoroughness and scientific character with the courses in the university, and that the training given should be adequate to prepare students for positions of responsibility as dispensing or manufacturing chemists. The law establishing a State Board of Pharmacy, which should license all druggists, was designed to advance the standing of that profession, and it was thought that students in large numbers would be induced to prepare themselves for pharmaceutical chemists, for which the existing courses in chemistry, botany, and microscopical technology offered special inducements. Mr. William Angell Viall was appointed instructor, and later assistant professor of practical pharmacy and lecturer on materia medica. The hopes of attracting large numbers of students to the school were not realized, and the department was formally abolished on September 24, 1890.

Colonel Oliver H. Payne founded the Medical Department of Cornell University in 1898. This far-reaching, beneficent act was the expression of a deep-seated interest in medical education, an interest which had grown and been fostered largely through an association with Dr. Alfred L. Loomis, his physician and friend. Colonel Payne saw that for the proper development of the best type of medical school it should be an integral part of a university of the first class, and he selected Cornell University as the institution best suited to fulfil the ideals he had in mind. Through the judicious management of Mr. Henry F. Dimmock and Dr. Lewis A. Stimson, plans were perfected which resulted in the acceptance by Cornell of a Medical College fully equipped in all particulars. On the part of the university, arrangements had been entrusted to President Schurman, Mr. William H. Sage, and Mr. Samuel D. Halliday of the trustees. Mr. Horace White and ex-Governor A. B. Cornell were subsequently added to this committee; and on April 14, 1898, upon the unanimous recommendation of the committee, the Cornell Medical College was inaugurated. The school was established in New York City in order that it might have adequate facilities for clinical teaching, but arrangements were made for the duplication of the first two years of study at Ithaca.

It is now necessary to go back of this important event in the history of Cornell University in order to give a proper conception of the scope and aims of the movement.

In the winter of 1896 and 1897, there existed in New York City a corporation known as the Medical College Laboratory, which was controlled by a board of trustees, eight in number, of which three were laymen and five were members of the governing faculty of the New York University Medical College. Associated with this laboratory was the Loomis Laboratory, an independent corporation governed by a separate board of trustees five in number, of whom three were laymen and two members of the governing faculty before mentioned; both institutions were the gift of Colonel Payne. Under this holding of property the buildings on East 26th Street, facing the southern gate of Bellevue Hospital, were secured for educational purposes to the faculty in control of the medical school. For several years this school had been unable to meet the expenses incurred in attempting to conduct it in keeping with the rapidly increasing educational demands which the advance in medicine, chiefly in the direction of laboratory work, and in teachers, necessitated. The deficit was made up by Colonel Payne, although he had already given to the Loomis Laboratory a sum sufficient for its maintenance. The relation of the Medical College to the University of New York was thus one of entire independence as to its property and expenses. In the matter of faculty and the subordinate teachers and assistants, it exercised and maintained the right to elect or appoint each and all of them, the council of the university merely reserving to itself the right to approve or veto an election to any one of the eight leading chairs: anatomy, chemistry, physiology, pathology, materia medica, obstetrics, surgery, medicine. As these appointments were practically for life, and as the council rarely, if ever, exercised the right of veto, the holders of these eight chairs governed the college in all educational matters. The combination of property and educational control was thus practically assured to the body constituting the governing faculty of the University Medical College. This body and the laymen associated with it in holding the property, and providing for the expense of maintenance, realized that a closer union with the university was desirable,



DISSECTING ROOM, CORNELL UNIVERSITY MEDICAL COLLEGE, NEW YORK, N. Y.

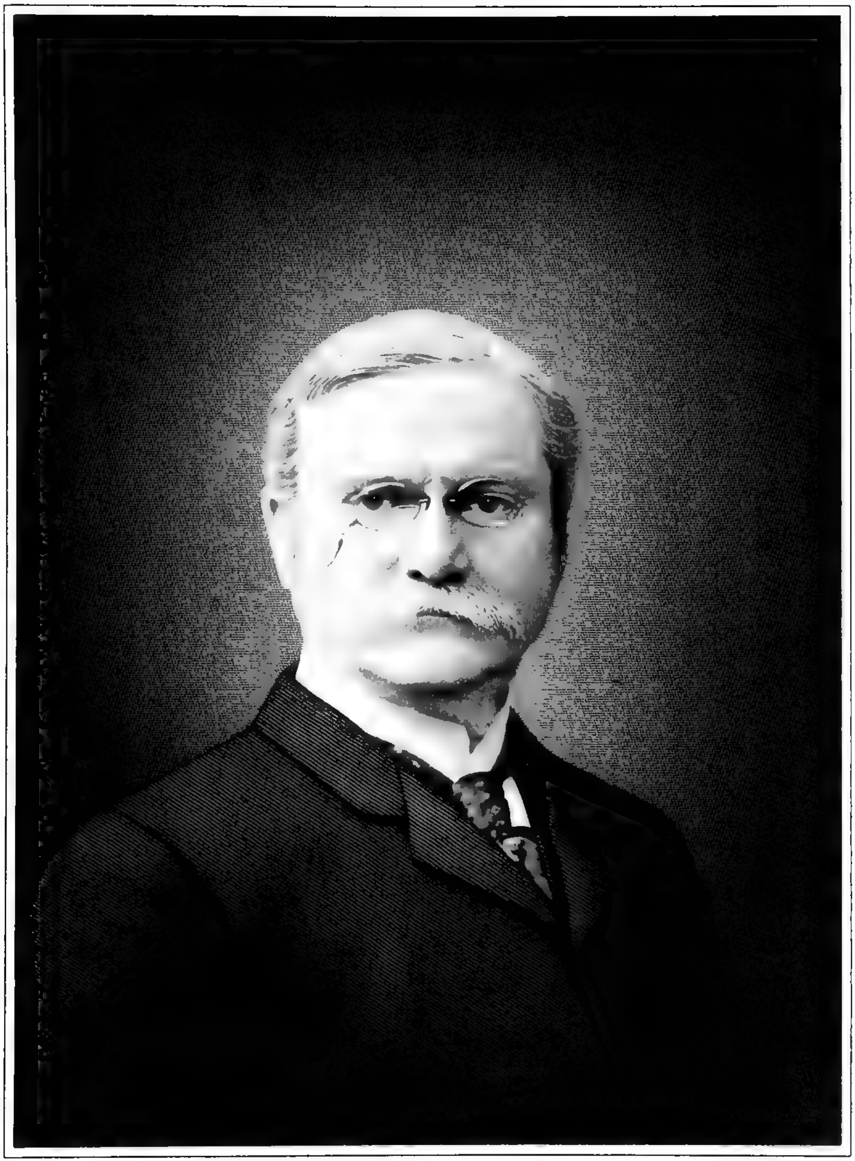
that the university should control all of its property, assume a more direct responsibility for it, and take a deeper interest in its affairs in general than it had done before. To this end negotiations were opened with the chancellor and the council of the university. An agreement was reached by which the property of the Medical College Laboratory (worth about $200,000, and, through the action of Colonel Payne, free of all debts) was transferred to the university, upon the condition, however, that the council should continue in office its " Committee on the Medical School." This committee was composed of laymen who had been induced chiefly through the influence of Dr. A. L. Loomis and Dr. Lewis A. Stimson to enter the council as friends of the Medical Department, and who would interest themselves in its material and educational development. Its personnel was such, consisting as it did of Oliver H. Payne, Henry F. Dimmock, Charles S. Miller, and Charles T. Barney, that the faculty looked forward under its guidance and assistance to the speedy attainment of a greatly increased efficiency and prosperity. The vital feature of the medical school was the maintenance of the personnel and powers of this committee. Relying upon the assurances of the chancellor of the university they waived mention of this compact in the deed of transfer, allowing it to appear that the university took over the property and its debts, the inference being that the assumption of the debts constituted the value paid. There were no debts, however, so in fact the only compensation given was the assurance covering the personnel and powers of the medical committee of the council. The importance of this assurance lay in the fact that it insured to the medical faculty the opportunity to fully carry out its plans for the betterment of medical education. These plans involved an expenditure far in excess of any possible revenue that could be gathered from its classes, even though they should exceed those of the easy days of preparation and graduation, when they numbered from 700 to 800. Under increasing requirements for graduation demanded by the faculty, classes had even diminished, and as it was made evident that the resources of the university could not and would not be applied to meet any such draft as this plan called for, the only support lay in the interest and good will of the medical committee.

This was fully understood on the part of all concerned when the assurances were given upon which the faculty acted. A short time after the transfer of the property, however, it was learned that the university contemplated another plan of action involving in many ways a radical departure from that originally contemplated. When it became evident that the educational programme which this faculty had outlined would not be carried out, six of the eight members (two had resigned) who had been instrumental in effecting the transfer of the property, joined with the lay trustees in a request to the council to abrogate the agreement and return the property. This was declined, and later the antagonism was accentuated by the officers of the university declining to live up to the assurances concerning the personnel and powers of the medical committee, and refusing to re-elect to its body a most important member of that committee, one who had been most prominent in his advocacy of the duty of the council to fulfil the promises through which it had acquired so large a piece of property. It replaced him with a member who was equally active in advocating the course which this council had concluded to follow, a course at variance with that to which its chancellor had been allowed to commit it. The most influential and important members of the council took a view in harmony with that held by the medical faculty, but they were not heeded, and therefore they resigned. This included the president of the council, and all the medical committee excepting the one new member.

During the time that the alternate plan was under discussion, the faculty, who then held practically a life tenure of office, were induced to send in their resignations, in order to permit the readjustment of positions which this alternative called for. But the exigencies of the situation did not warrant the university in forcing through this plan just then, so it reappointed, for one year only, the six remaining members of the former faculty, permitting them to provide lecturers for the period named, to fulfil the duties of the two vacant chairs. The subordinate positions were assigned to the former occupants. It was evident that this action was but a halt in the programme of enforcing the alternate plan, a halt occasioned, however, by the arrest of negotiations for the transfer of the Loomis Laboratory, which, with its endowment, represented $225,000. The session of 1897-98 marked therefore a truce between the officers of the university on the one hand, and the medical faculty on the other. The latter resumed their duties determined to neutralize the disintegrating influence working against them by increased effort and vigilance. They stipulated that all the subordinates should be paid in full as before, they themselves to receive only such salary as remained after all other expenses had been paid. This resulted in a three-fourths reduction of the compensation they had received under the administration of the Medical College Laboratory, but it insured the efficiency of all subordinates, a matter of special importance just then, and one for which this faculty was ready to make even greater sacrifices had they been needed. In spite, then, of the inimical forces at work, a successful course marked the last session (1897-98) conducted by this faculty for the University Medical College.

At the time of transfer of the Medical College Laboratory property, it had been the intention of the trustees of the Loomis Laboratory to make the same disposition of that institution, but as has been intimated, the symptoms of repudiation of promises which appeared, arrested, and finally broke off, all negotiations to that end. When the time approached for the reappointment of the medical faculty, their tenure being now but for one year, each member was informed that his reappointment would depend upon his influence being exerted to secure the transfer of the Loomis Laboratory to the university. Even had the members of that body power to induce such a transfer, the condition was one that could not appeal to them from any standpoint, so they ignored this remarkable communication and made ready to close their connection with the university. They were all the more disposed to take this action because of the continued refusal of the university to return to them property already transferred, and especially because of the disappearance from its council of every member who had supported this request, and had been friendly to the plan of education which they deemed essential. The absence of this element made it certain that their day of usefulness to the New York University was at an end.

In order to be free to follow uninterruptedly the development of the Cornell University Medical College I will now close this preliminary sketch by telling of the action taken to recover from the New York University the property which it persisted in retaining. Suit was brought in the State Supreme Court. To offset this action the university, on the strength of a minute in the proceedings of the medical college faculty, to the effect that the Loomis Laboratory was to be used as a



H M Peck

place for teaching students of that college, brought a counter-suit to acquire this laboratory and its endowment. Both suits were decided adversely to the university, as were subsequent appeals, first to the Appellate Division of the Supreme Court, and finally to the Court of Appeals of the State, the decision of this last court being maintained. This has led to the return of the property which the university so strenuously tried to hold, and no doubt it will ultimately take its place as an additional asset alongside the Loomis Laboratory, which has already been presented to Cornell. The triumph thus achieved completed the justification of Colonel Oliver H. Payne and his friend, Henry F. Dimmock, and of each and every member of that faculty which left the New York University. Moreover, it is a fitting reply to the devious policy which would thrust into the control of a respectable educational institution manners and methods more appropriate to the exigencies of wreckers than to the obligations of those entrusted with the moral and mental training of youth.

The question of the future was now met by the suggestion that this faculty should offer its services to Cornell University in connection with the medical school which that institution proposed to establish. The offer was made and accepted, and on April 14, 1898, they were appointed by the Board of Trustees to the chairs which they now hold. The large majority of the subordinate teachers in the New York University Medical College elected to follow the fortunes of the men with whom they had long been associated, and at whose hands all of them had received their preferment and advancement. Four members of the faculty of the Bellevue Medical College preferred to associate themselves with Cornell, and with the subsequent addition of a head for the chair of pathology, professors of clinical chairs, and some subordinate teachers to meet the expansion demanded by the plan of education proposed, the faculty stood complete. One hundred and eighty-five students of the University Medical School followed this faculty; they were joined by thirty others, who in like manner united their fortunes with their professors, the four who came from Bellevue College. As all these students had been studying medicine one and two years, they, together with the new enrollments, permitted the formation of successive classes, so that the school began its labors in the fall of 1898, with a class in preparation for graduation the following year, accompanied in regular order by others in like preparation, to take their places and continue uninterruptedly the annual roll of applicants for graduation.

Quarters were secured within the grounds of Bellevue Hospital, to which institution the school looked for the greater part of its clinical facilities. These facilities were available because of the connection of many members of the faculty with this hospital. The Loomis Laboratory was placed at the disposal of the new school, thus completing a combination of resources sufficient to insure a successful beginning for the new institution.

It had long been evident that a change in the methods of medical education in this country must be made, if its schools were to keep in touch with the advances which the science and art of medicine and medical teaching were making. Under the early system, a student came to his school accredited from a preceptor, a practitioner under whose guidance he had read medicine somewhat, and with whom he had had some opportunity for observation. This custom had fallen largely into disuse, so that most students entered a medical school with no prior knowledge of the subject. Thrust at once into the lecture rooms, didactic and clinical, associated with others who had already been in attendance one or more years, they were confused rather than instructed. Text-book reading supplemental to notes of the lecture was not sufficient, so that those who could afford it speedily placed themselves under an instructor or quiz master. The most popular quiz masters were those who conducted their instruction wholly from accepted text-books, paying little attention to the lectures, except to instil any special view or opinion held by any one of the professors who conducted an examination for graduation, or for some hospital appointment. Some of these quiz masters acquired and merited widespread reputations, and an increasing number of students found that they could gain a more satisfactory knowledge of the theory of medicine by giving the maximum of time to the quiz master, reserving the minimum for the regular curriculum of their school, devoting this minimum mainly to the clinical lectures. Thus in most of the larger schools two teaching centers arose. Some endeavored to bring the work of these instructors within the authorized curriculum, but as the compensation offered was less than many of the quiz masters gained through independent work, the competition continued. The essence of this conflict lay, however, not so much in the failure as teachers of those who lectured, but in the fact that the two systems covered in a too limited period the same ground, and the quiz system brought the student in the time allotted closest to what he aimed at, an available knowledge of the elements of medical education.

Meanwhile medical knowledge was broadening in every direction—two years was still the maximum period of study for graduation, and each lecture course was supposed to be a repetition of the preceding year. Gradation of subject was attempted by some, resulting too often in a single but too condensed presentation of much that was important; this again played into the hands of the quiz system as anyone can realize who, given but one opportunity, and that limited, strives to master a subject. Since the student could gain his diploma in two years, he naturally went most where he could soonest get what he needed for the oral or written examinations required therefor—the quiz. Two developments now took place which arrested this extramural movement of the student body, the extension of the laboratory system and the increase of the course to three and four years.

The laboratory system became a necessity to chemistry, physiology, pathology, and materia medica. Anatomy had long been taught by personally conducted dissections, so that five-eighths of the course at least had now to be pursued within the college walls, and under the eye of the professor and his assistants. The added years permitted gradation of subjects; primary subjects could be confined to the first year or two, advanced subjects reserved for the last year, or the last two years. The clinical features of the course could be elaborated and brought to immediate contact with every student, examinations could be made practical, both at the laboratory table and the bedside, and these examinations could be held at the end of each year, instead of being postponed till the degree was sought. All this meant an increase in the dignity and importance of the intramural medical college work, but it also meant an expenditure too great to be met from the student fee. With the increase in time and money came an increase not merely in the staff of the laboratories, but in that of the didactic and clinical departments as well, paid drillmasters could now be employed wherever needed, and the head of the department left free to expand and elaborate the advanced and more complex portions of his course. The triumph of this educational system was expensive, but in schools adopting it it was complete.

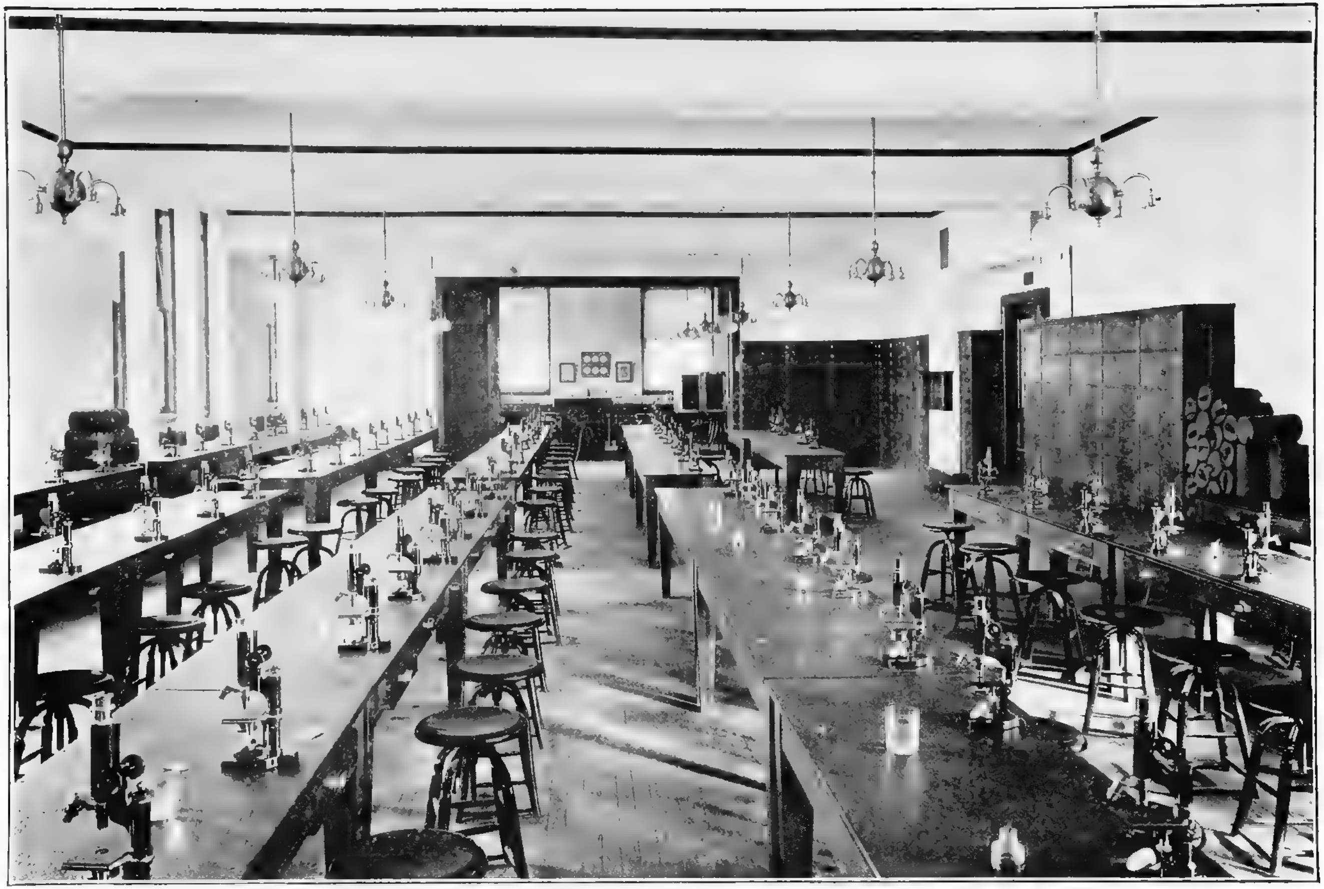
The faculty who took charge of the Cornell University Medical College had borne its part in bringing about the changes in medical education which we have outlined, and as early as 1882 commenced to devote its meager resources to the inauguration of a plan which should meet the demands of the rapidly shifting situation. First they built an annex, wholly devoted to clinical work, then, as has been stated, Colonel Payne provided the Loomis Laboratory, where chemistry, physics, physiology, and pathology found facilities for their laboratory courses. In 1887 he went further and bought from them their entire plant, and provided for their salaries, and those of a corps of junior instructors to be utilized in the laboratory work and the classroom. In this manner the system of instruction now prevailing in the Cornell Medical School was commenced. It has now been in operation at Cornell for six years, and has been elaborated and extended to a point which seems to embrace the extreme margin of educational profit; further good from the system must be sought in perfecting the interior, not in expanding the structure. The essence of the system lies in objective teaching, and in enforcing it in every department as far as time and means will permit; by which is meant reducing the class unit and increasing the number of teachers, so that each student under the immediate supervision of a trained hand is held in personal contact with the object of study.

But the classification and arrangement of the mass of material that comprises a medical education is best made through text-book study and recitation, and here again the best results are obtained with small rather than with large class units. In fact, the principle observed in the training of soldiers is quite apt in the making of doctors of medicine. Squad drill is the proper foundation of both systems. When a student, trained after the manner here outlined, comes to the point where his knowledge is to be focused, namely, upon the person of the sick, he is ripe for the directing hand of the department head, whose knowledge and intuition point the way for the application of each and every ray that may be needed to expose the malady and designate the remedy.

There can be no question as to the value of an able lecturer, and when he arranges his discourses so as to make them the complement of the text-book course, the place of the lecture in our school is reached.

Another feature of great importance is the rigid examination for each year's work. The effect is the elimination of crude material which could but be a drag upon the better prepared element in the work of the ensuing year; and moreover, it serves the good purpose of arresting at the threshold many a one who, after wasting time and money in four or five years of study, would have to be denied a diploma. The rigid adherence to this provision is rightly considered one of the most valuable features of the system of education in operation in this college.

It is evident that the plan adopted required buildings with interior arrangements differing essentially from such as were appropriate to the purely lecture system, where large amphitheaters prevailed. Large rooms were needed for the laboratories and dissection classes, but many small class and lecture rooms were a necessity in the present system, for its success depended upon the simultaneous presentation of the several subjects to fractions of the general class, rather than consecutive presentations to the whole class. The element of time alone compelled such an arrangement, as can be readily seen when one recalls the facts. There are eight hours



CLASS ROOM, DEPARTMENT OF PATHOLOGY, CORNELL UNIVERSITY MEDICAL COLLEGE, NEW YORK, N. Y.

a day available in each of the 33 weeks of the course—about 1,580 hours in each year. One thousand hours are consumed in the classroom, amphitheaters, and laboratories in the several subjects of the first year alone. Given three additional years of study for each of which like provision has to be made simultaneously for an equal or greater number of hours for similar work, and it is evident that abundant subdivision of space must be made to provide quarters for the many sections into which the four classes must be divided. In other words 6,336 hours annually are needed for the four classes. Teaching space and teachers must therefore be multiplied to meet the inevitable subdivision of each class.

As soon as the school was opened Colonel Payne began the erection of the building now occupied. Instead of limiting himself to the stipulations entered into with the university, he went far beyond, and not only erected a building at a cost of a million dollars, but added an endowment which put the school on a very firm footing. The planning of the interior was assigned to the faculty, and under their supervision it was constructed so as to fit the educational system already adopted, a circumstance which helps to explain the smoothness with which the system moves within our walls. Seeing that the building is one of the architectural features of the city of New York a description of it here will not be out of place. We ask attention to a feature, the wisdom of which will appear to educators in general. It is the compactness of the structure, the utilization of every inch of space, the close relation of the several allied teaching centers, and the economy of maintenance thereby secured, which constitutes a valuable feature of any institution.

The exterior is designed after the more severe style of architecture of the Renaissance. It is divided into two parts, one for teaching, the other a dispensary, each with a main entrance on First Avenue. The interior arrangement is as follows: The basement is commodious, well lighted, and ventilated; it contains the engines, boilers, dynamos, and ventilating machinery, the refrigerating and cold-storage plant, with the injecting and freezing rooms, a large room with lockers, and another for bicycles. Storerooms, including one for drugs, four rooms, including a small theater and a workshop for orthopædic surgery. Toilet rooms, lavatories, and several rooms for the janitor of the building, are also found here. On this level, but outside of the building, is a large incinerating furnace for consuming all the refuse from the college. The principal entrances to the building are on the first floor. They open from First Avenue into vestibules, one leading to the main hall of the school, the other to the general waiting room of the dispensary, between which the large amphitheater is situated.

The rooms of the children's department, which include an isolating room and a small theater, are placed between the entrances, while around the waiting room of the dispensary are located the office for distributing patients, the pharmacy rooms, the departments of surgery and medicine, waiting and dressing rooms, lavatories, and rooms for the Roentgen-ray and sterilizing apparatus.

Grouped around the main hall of the school on this floor are the council and faculty room, the office of the dean, the secretary, and the clerk, a large reading room for students, and the lower part of the large amphitheater.

Upon the second floor the same general arrangement prevails. On the side of the dispensary there is a large waiting room, surrounded by rooms assigned respectively to the departments of genito-urinary diseases, diseases of the nervous system, of the skin, and of the ear, while covering the space at the middle front of the building are the rooms belonging to the departments of the eye and the throat, with a series of twenty dark stalls for the simultaneous examination of as many patients by as many students. Small waiting and dressing rooms and lavatories for the convenience of the patients are also found on this floor. The upper part of the large amphitheater, extending from the floor below, occupies the center of the rear half of this floor. The remainder of the floor is given up to the school. Here is found a hall, around which are grouped recitation rooms and laboratories for clinical pathology. These laboratories have convenient access from the dispensary, permitting ready co-operation in the work carried on there.

The third floor of the building is given up to teaching space, excepting an area upon the " dispensary side " of the building, which is assigned to the departments of gynæcology and obstetrics. This comprises a small theater, examining, waiting, dressing, and toilet rooms, manikin and two recitation rooms. The remainder of this floor is occupied by two amphitheaters (each having a seating capacity of about 175 students), one for anatomy, physiology, and pathology, the other for chemistry; attached to each are preparation and research rooms. The chemical laboratories also occupy this floor, including the main laboratory, the laboratory for physiological chemistry, rooms for apparatus, etc., and a library of chemistry.

There is the usual hall and corridor space, with toilet rooms and lavatories.

The fourth floor is occupied in part by the upper portion of the two amphitheaters, which extend from the floor below. The department of pathology and bacteriology occupies the remainder of this floor. Ample facilities are provided, not only for the class work and demonstrations, but for special and advanced courses and investigations. A library of pathology and bacteriology is situated here.

The fifth floor is devoted to the department of practical anatomy. The main dissecting room occupies a space of 160 by 55 feet; there is also a large room 40 by 50 feet, which is set apart for advanced undergraduates and post-graduates. These rooms can be cooled by the refrigerating plant in such a manner as to permit the pursuit of practical anatomy with as much comfort in summer as in winter.

This floor contains lockers for three hundred students, a small demonstration theater with prosecting and cold-storage room attached, private dissecting rooms, a bone room, a library, a reading and study room, and a commodious room for instruction in operative surgery.

The department of photography, the animal house, and a room for the preparation of bones are placed in a half-story at the top and rear of the building.

There are two main staircases, one for each department of the building, passenger elevators, and a freight lift.

The building itself is fireproof throughout, being constructed of steel, stone, brick, marble, and tile. The glazed brick and glazed tile walls, tile floors, and enamel-painted cast-iron trimmings of the doors, and the interior of the windows, insure cleanliness. Special attention has also been paid to the problems of refrigeration, lighting, heating, and ventilation, so that every part of the structure can be easily kept at all times in an agreeable and sanitary condition.

The Loomis Laboratory

The Loomis Laboratory is located at 414 East 26th Street, opposite the entrance to Bellevue Hospital. It

CHEMICAL LABORATORY, CORNELL UNIVERSITY MEDICAL COLLEGE, NEW YORK, N. Y.

is built of brick and Indiana limestone, is five stories in height, and cost one hundred thousand dollars. The first floor contains a lecture room, capable of seating about sixty students, and also a large room thoroughly equipped with a physiological apparatus used in experimental work in the department of pharmacology. The second floor contains a room twenty-five by sixty feet, furnished with forty specially constructed tables, each supplied with running water, gas, and electric connection. This is the students' laboratory and devoted to the department of pharmacology. The laboratory is completely supplied with all crude drugs used in the practice of medicine and their various preparations, also the various apparatuses used in manufacturing and compounding drugs. The front of this floor consists of a large room with two small rooms connecting, used by the instructor in pharmacology, and by graduate students for original research work in this department. It is completely supplied with valuable physiological apparatus. The third floor contains an experimental laboratory, which is devoted at the present time exclusively to the study of cancer, utilizing the income from a fund of one hundred thousand dollars left by the late C. P. Huntington for this purpose. On this floor is also a room fitted up for the experimental study of the action of drugs upon animals. This room is utilized by the students of the college during their laboratory course in materia medica and pharmaceutics. The fourth floor is devoted entirely to the study of bacteriology and experimental work in pathology. It contains six rooms and is completely supplied with all the essential apparatus for this work. The fifth floor contains in the rear a photographic room and large apparatus for taking microphotographs; a large animal room capable of accommodating fifty or more animals; a workshop, and a small students' room for private work in the department of bacteriology.

The faculty is satisfied for the present with its plan of education, seeing that while it can be rigidly fulfilled it is yet sufficiently elastic to withstand any essential alterations the future may require. The mission of the school, as they view it, is the making of efficient practitioners of medicine, to give its graduates a comprehensive knowledge of medicine in all its departments, and to this end it guards its curriculum jealously, " limiting each subject and measuring its time allotment in accordance with what it believes to be its relative value as an element of substantial medical education," it therefore makes it its business to pass in review and measure the work of every professor and instructor.

And yet it is realized that teachers who are confined to the " grind " inseparable from the task of making even good doctors of medicine must grow stale; they need in their work the stimulus of opportunity for research; it is the intent, therefore, to present this opportunity to every department of the school. The Loomis Laboratory has already been assigned to this duty, and research investigations have been already begun in the departments of pathology, therapeutics, and physiological chemistry. The chief of this laboratory is wholly separated from the undergraduate teaching corps, giving his entire time to the conduct and supervision of such lines of investigation as it may be desirable to initiate. Therefore, as the occasion arises his staff will be increased to include assistants trained to the execution of experimental work in any direction, whether it belong to a primary subject or be the outcome of a desire to master some complex clinical problem, medical, surgical, or obstetrical. It must not be supposed that departments having their own laboratories are denied the opportunity to conduct within themselves such investigations as they wish to initiate, for this is not the case; they are merely cautioned to conduct such investigations in a manner to avoid conflict with undergraduate teaching. The opportunity which is thus afforded our teachers or students to easily pass from the atmosphere of the practical to that of the experimental will insure to us a spirit which cannot fail to appeal to anyone wishing to give his mind and heart to medicine.

Because of this we expect our teaching corps in time to be composed mainly of those who, first of all, are teachers, our leading men giving to teaching, more time and preparation, and to the exclusion of affairs outside the laboratory, the classroom, the ward, and the amphitheater, than prevails in medical schools in general, not separating themselves wholly, however, from extramural affairs, but giving out their best within the walls.

In spite of what has been done we yet feel that our task still lies in the development of each department of the school to its highest attainable point, always bearing in mind that the attainable points must be conducive to a substantial medical education.

From certain points of view we are backward in our department of physiology, and yet this criticism is less deserved if it be considered that much of the work done elsewhere in this, is placed with us in other departments. Histology and embryology are amply provided for in the departments of anatomy and pathology, physiological chemistry is cared for in the department of chemistry, and the laboratory of physiology is thus left free to deal with respiratioin, circulation, muscle action, secretion and excretion, and the phenomena of normal tissue metamorphosis. There is a feeling with us that the relation between physiology and pathology should be strongly accentuated without denying to pure physiology a sufficiency of attention. The question of sequence of subjects has likewise come before us, whether it is best or not to confine our students at first to the study of anatomy and chemistry, to be followed by physiology and then by pathology, bacteriology, and materia medica. So far we have done no more in this direction than give the course in histology, and a preliminary study of the viscera, prior to the consideration of the physiology of those organs.

Coming now to the crown of this educational structure, the clinical features of the course, we find them satisfactory, and yet not entirely so, because too much time is given to clinical work in the specialties. If this work could be made elective, or, better, transferred to a fifth year, a benefit would accrue to the student in more important branches, included in the departments of medicine, surgery, and obstetrics. Our dispensary, which is an integral part of the school, and our hospital connections, give us a sufficiency of clinical material. We need, however, more time in which to present and incorporate it in the course of the closing year of study.

The most serious question now before us relates to the amount of preliminary education that should be exacted of those who seek to enter the school. Shall it be that which is covered by the degree of selected universities, the half-dozen, for instance, that now stand first in America, or shall we place the barrier immediately behind all college degrees, or place it so as to include those holding the high-school diplomas, or go even farther and admit anyone who can meet the requirements for graduation from the public schools of the state?

The reasons which led to the creation of Cornell University and the moral obligation under which it rests to the state for its initiation compels a closer regard

Newton M. Shaffer

toward the state system of education than is the case with institutions of different origin. This system ends with the high school; it seems appropriate, therefore, for the present at least, that this college demand as the minimum requirement for entrance the New York State High School diploma.

We have mentioned the fact that at the inception of the school arrangements were made to duplicate at Ithaca the first two years of the course. The laboratories already existing in conjunction with the Veterinary College, the chemical laboratory, and the distinguished place held by the department of comparative physiology, made this an easy purpose to fulfil. The most serious obstacle was encountered in anatomy, but all the difficulties have been overcome, so that now a student can find at Ithaca the same course in the first and second year of study he meets with in New York City. The advantage which is thus given the students of the university is fully realized by anyone wishing to take, in the last year of the university course of study, the full course required in the first year of medical education; and the line is drawn so sharply between the preliminary subjects—that is, anatomy, chemistry, physiology, materia medica, and bacteriology, studies confined mostly to the first two years,—and those that belong to the two closing years, that a student taking the first year at Ithaca does just as well to round out his preliminaries there by taking the second year also. Cornell students, therefore, have the same opportunity to pursue medicine at Ithaca that is afforded students of universities wholly situated in cities. The medical building at Ithaca is the gift of the late Dean Sage, a handsome structure, admirably planned and appropriately named " Stimson Hall," in honor of Dr. Lewis A. Stimson, the professor of surgery, who, in conjunction with Mr. Dimmock, wrought out the conditions which were essential in the creation of the school.

The medical college has enrolled over two thousand students since its foundation, distributed through the years as follows:

1898–1899	274
1899–1900	328
1900–1901	336
1901–1902	415
1902–1903	385
1903–1904	360

As an index of the efficiency of the course of study, it is interesting to note the percentage of each class which won, in competitive examinations outside the college, places in the leading hospitals of New York and vicinity.

Class	Graduates	Hospital Appointments	Percentage
1899	70	30	42%
1900	57	36	58%
1901	24	16	66%
1902	58	41	71%
1903	60	47	78%
1904	55	32	59%

Cornell University Medical College in Ithaca

From the very foundation of Cornell University in 1868, provision was made for the preliminary education of students who intended to enter the medical profession. Selected courses were arranged in the department of natural history with special reference to the needs of students who intended to become naturalists or physicians. Instruction was given in comparative anatomy, zoölogy, botany, physiology, physics, geology, and veterinary science, besides work in language, literature, history, political science, and mathematics.

For the head of this department the university was fortunate to secure the services of Burt G. Wilder, B. S., M. D. Trained in anatomy and zoölogy by Wyman and Agassiz in the Lawrence Scientific School of Harvard and a graduate of the Harvard Medical School, and having seen service in the Civil War as a surgeon, Dr. Wilder was thus especially qualified to guide students in natural history, as well as those who were looking forward to a medical career. To his foresight and knowledge, aided by the active interest of President White, the credit is due of thus early establishing the course on a broad and liberal foundation.

The special course in natural history was continued until the abolition of all special courses in 1896. The entrance requirements were among the highest of any course in the university, and included Latin, Greek, French or German, and mathematics. The courses as originally given were extended from time to time, and new courses added to keep pace with the advance in science.

The same studies which were originally grouped in this special course are still taught, but with the establishment of an elective system covering all studies, the choice is left entirely with the individual.

It had been possible from the beginning for students who intended to enter a medical college, and who were unable to devote the whole four years to the course in natural history, to elect two or three years of the work. To meet the needs of this class of students a special course of two years (not leading to a degree) was established in 1878. This course was first known as a course in chemistry and physiology, but later the name was changed to the medical preparatory course. The course embraced subjects especially adapted to prepare a student to enter upon the study of medicine, and also enabled him to anticipate the work of the first years in a medical college. The subjects taught and their method of presentation had been arranged with much care after a thorough investigation of the work and methods in the best medical schools of the country.

The two years' course preparatory to the study of medicine contained, besides such general subjects as French and German, physics, chemistry, botany, and zoölogy, courses in microscopy, histology, and embryology, bacteriology, neurology, anatomical methods, and advanced anatomy. The work in anatomy comprised a study of lower animals, but also included the human body, students dissecting stillborn children, and, as opportunity offered, the adult body. The instruction in anatomy was originally given in McGraw Hall, but after the establishment of the Veterinary College a part of the work was transferred to that college under the direction of Dr. Hopkins, professor of veterinary anatomy. Dr. Hopkins had been associated with Professors Wilder and Gage in this work for a number of years before the establishment of the Veterinary College.

Among those who have taken the medical preparatory course either as a whole or as a part of the four years' course in science, are to be found the names of many distinguished in the medical profession.

Ever since the university opened, hopes had been entertained for the establishment of a medical department. But the general endowment of the university did not permit the establishment of such a college, and the proposals which were made from time to time for the affiliation of independent medical schools in other cities with the university did not include a provision for their endowment.

As already shown, the foundation studies of a medical curriculum had long been taught in Cornell University, but as the practical portion of the course necessitates association with hospitals, clinics, and dispensaries, which can only be found in a large city, no work of this nature had ever been undertaken. In 1898, through the generosity and wisdom of Colonel Oliver H. Payne, the trustees were enabled to establish a medical department in New York City fully equipped and finely endowed.

It was decided that the first two years of the course, consisting as it does mainly of the fundamental scientific branches, should also be given at Ithaca, where the opportunities presented by the long-established departments which had offered instruction in the medical preparatory course afforded unusual advantages for thorough study.

Among the facilities of the university which are available for the use of medical students may be mentioned the museums of vertebrate and invertebrate zoölogy, including comparative anatomy and entomology, of agriculture, of botany, and of geology. The university library, with its 280,000 bound volumes, nearly 50,000 pamphlets, and 600 current periodicals and transactions, is likewise as freely open to medical students as to other university students.

The original faculty at Ithaca consisted of Professors Caldwell, Wilder, Nichols, Gage, Moore, Orndorff, Trevor, Fish, Coville, and Chamot. The curriculum consisted of anatomy, physics, chemistry, neurology, physiology, microscopy, histology, embryology, bacteriology, and pathology, materia medica, therapeutics, medicine, surgery, and obstetrics. The university at Ithaca was already offering instruction in all of these subjects. It became necessary therefore only to change the character of the work to a slight extent in chemistry and physics, adapting the courses already given to the needs of a medical course, and to establish one or two additional courses of study for medical students.

Physiology had been taught not only in the department of physiology, vertebrate zoölogy, and neurology under Professor Wilder, but was also given in a separate course by Professor Fish in connection with the veterinary college. Until 1904 Dr. Wilder's elementary course was taken by all medical students. Additional courses in physiology and materia medica were established to meet the needs of the medical students. The work continued under his direction until 1903, when the increase in the number of students both in the veterinary and medical colleges, and the added work made necessary by this, as well as extended courses in both colleges, necessitated the separation of the physiology and pharmacology as given to medical students from that as offered in the veterinary college. The instruction given by Dr. Fish during these five years was most thorough and efficient, and much credit is due for his loyalty and devotion to the medical college work, for at times this addition to the regular work in the veterinary college was a heavy burden.

Since 1903 Dr. B. F. Kingsbury has devoted his entire time to physiology and pharmacology in the medical college. Dr. Kingsbury, who had been associated with Professor Gage as assistant professor of histology and embryology, assumed charge of this work after a most thorough training, both in the United States and in Germany. He received his M. D. from the University of Freiburg, where he had spent two years in advanced work in physiology and embryology, as well as in medicine.

The course in neurology, which had long constituted a part of the medical preparatory course as given by Dr. Wilder, was continued with but slight alteration to meet more closely the needs of medical students. Microscopy, histology, and embryology, which were an outgrowth of the department of physiology, vertebrate zoölogy, and neurology, had, upon the establishment of the New York State Veterinary College, been made an independent department, and the instruction had been given in the veterinary college. Professor S. H. Sage, who is in charge of the work in these subjects, is everywhere recognized as one of the leading men in this field, he having established one of the first courses of this character in the country, and moreover, as one of those having great interest in the medical preparatory course, he had personally visited many of the best medical schools, and had investigated their methods and work. Upon him, since 1878, had rested the main responsibility for this course. At the time when the medical college was established, the instruction in histology and embryology as given to students of science and of veterinary medicine was admirably suited to the needs of medical students. It was therefore only necessary to procure additional instructors, microscopes, and equipment, and to change but slightly the character of the work, to make it one of the strongest courses in the country. The work was given in the veterinary college until 1902, when, upon the completion of Stimson Hall, the department of histology and embryology was transferred to that building, where the department has since found a home.

Since the establishment of the New York State Veterinary College, general pathology and bacteriology for veterinary students have been given under the direction of Dr. Veranus A. Moore. A graduate of Cornell University in science, in 1887, and of Columbian University, Washington, in medicine, he was for many years connected with the Bureau of Animal Industry in Washington, and resigned as chief of that bureau to return to Cornell. From his researches in animal diseases, he is everywhere recognized as one of the most prominent comparative pathologists. Trained alike in the pathological conditions peculiar to man, as well as animals, and appreciating keenly the close interrelation between them, he is admirably fitted to direct these courses for students of human medicine.

Although anatomy had been taught as a part of general comparative anatomy under the direction of Professor Wilder, and later in the veterinary college, under Professor Hopkins, when the medical college was established, it became necessary to organize this work on considerably more extensive lines than had hitherto been done, and it was found needful to procure separate quarters, and to appoint a new professor to supervise the work.

The university was fortunate in securing the services of Dr. Luzerne Coville to take charge of the newly established department of human anatomy. Dr. Coville was a graduate of Cornell University, B. S., 1886, and of the College of Physicians and Surgeons, Columbia, in 1889. From 1889 to 1891 he was resident physician and surgeon in Bellevue, New York, and in St. Mary's Hospital, Brooklyn, and was later engaged in private practice in Brooklyn from 1891 to 1894, and at Oxford, N. Y., in 1895. Since 1896 Dr. Coville has been practicing in Ithaca. His appointment as lecturer in anatomy carried with it also the position of secretary of the medical faculty and acting head of the medical department at Ithaca. From his previous training and experience he was admirably fitted for the position to which he was appointed, and to his judgment and ability the early success of the medical college in Ithaca owes much. For anatomy the executive committee of the university assigned rooms on the fourth floor of White Hall in the south hall. These rooms, which constituted very cramped quarters, were fitted up in an excellent manner considering the possibilities of the case. Ventilating apparatus was installed, and equipment provided, it being expected that during the first year some twenty students would take the work. As a matter of fact, forty-one students were registered in the medical college for the first year, and in the second year provision was made for thirty more, but the registration in the second year was just double that of the first year of the course. Only those who have had experience in organizing a new department can fully appreciate the indefatigable zeal with which Dr. Coville prosecuted his work in putting his department upon a sound foundation and accumulating such a considerable amount of equipment as he did within the two years during which he was lecturer in anatomy.

After two years as lecturer in anatomy and secretary of the college, with the largely increased classes and the increased amount of work, it became necessary for Dr. Coville to decide either to devote himself entirely to the work of the medical college, or to give up a portion of that work and devote himself to his private practice, which in the meantime had been steadily growing. He decided upon the latter course, resigning as lecturer in anatomy, and being appointed to the position of lecturer in surgery. In February, 1903, greatly to the regret of the medical faculty, Dr. Coville felt compelled to resign his lectureship in surgery. The course under his direction had been made stronger and more efficient each year.

During the spring of 1899 it became necessary to provide for the elementary recitation work in surgery, obstetrics, and medicine. For this work Dr. Paul R. Brown was secured; a graduate of Berkshire (Mass.) Medical College, a retired major of the United States Army, he was appointed with the title of lecturer in medicine, obstetrics, therapeutics, and surgery. He was eminently qualified for this work from his long experience in the army. This position he held for one year; as at that time therapeutics was dropped from the course of the second year, and Dr. Coville took up the work of surgery, Dr. Brown's title became that of lecturer in medicine and obstetrics.

In 1903 Dr. Eugene Baker was appointed to take charge of the work in medicine and obstetrics in place of Dr. Brown, who had moved to the West to engage in active practice as an operative and consulting surgeon. Dr. Baker is a graduate of Cornell University, B. S., 1878, and of the University of Michigan, M. D., 1882. His practice in Ithaca is one of the largest in the city.

Dr. M. T. Sudler, of the department of anatomy and histology, had charge of the work in surgery from the date of Dr. Coville's resignation in February, until the appointment of Dr. M. B. Tinker as lecturer on surgery in September, 1903.

Dr. A. T. Kerr was appointed assistant professor of anatomy in 1900, and succeeded Dr. Coville as secretary of the faculty. Dr. Abram Tucker Kerr graduated as Bachelor of Science of Cornell University in 1895, and at the University of Buffalo in 1897. Upon graduation he became acting professor of anatomy, and during the following year adjunct professor and demonstrator, with full responsibility for the practical anatomy, in the University of Buffalo. Early in 1899 he went abroad on special leave for study of anatomical teaching in England, Scotland, and Germany, finally becoming a pupil of Merkel, in Göttingen. Recalled to America by the death of his father, Dr. Kerr spent the following year in anatomical research under Dr. Mall, at the Johns Hopkins University. Professor Kerr is a member of the American Microscopical Society, and of the Association of American Anatomists. He is a contributor to the *Reference Hand-Book of the Medical Sciences,* and to medical journals.

Dr. Kerr was promoted to the rank of professor of anatomy and secretary of the Medical College in Ithaca in 1904.

During the year 1900-01, the work of the department of anatomy continued in the fourth floor of White Hall, but in 1901-02 the classes in the medical college had increased to such an extent that it was impossible to care adequately for the anatomy in these crowded quarters, although the space allotted to the subject had been doubled since the first year. Fortunately by this time the work on the new medical college, Stimson Hall, had progressed sufficiently so that it was possible to use the third floor of the building as a dissecting room.

Since this time the department of anatomy has been housed in Stimson Hall, and in the following year the departments of histology and embryology and of physiology found quarters in this building.

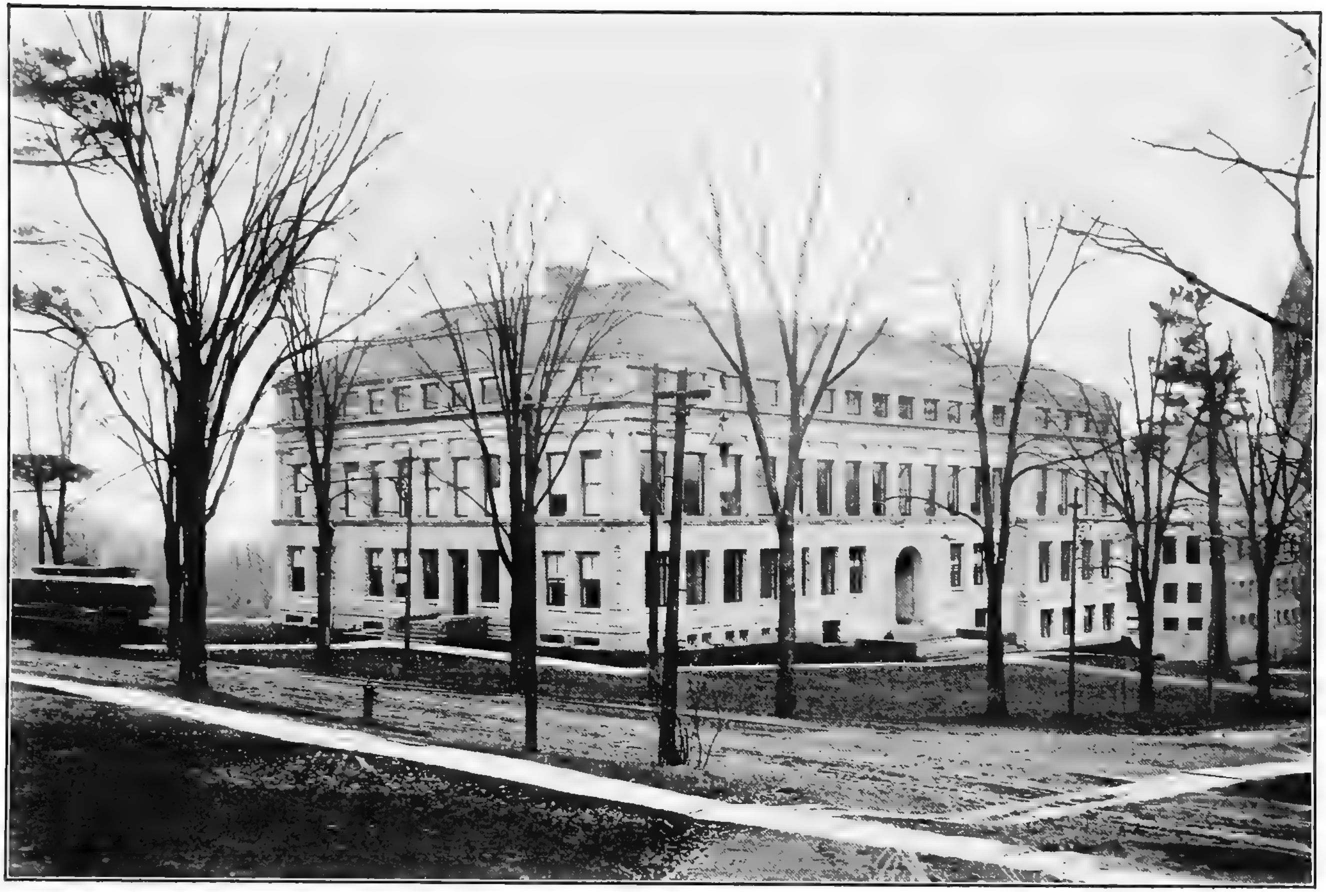
In the spring of 1900, through the generosity of the late Dean Sage of Albany, the university was enabled to erect a building upon the campus at Ithaca especially for the medical college. On the left-hand side of the entrance is a beautiful tablet bearing the following inscription:

> *This building for the Ithaca Division of the Medical College was given to Cornell University by Dean Sage of Albany, and named, by his desire, Stimson Hall, in recognition of the services rendered toward the establishment of the Medical College by Lewis A. Stimson, M. D., LL. D.*
>
> *MDCCCCII*

In planning Stimson Hall the greatest pains were taken to procure the best adapted building possible. The Board of Trustees sent two of the faculty, Professor Gage and Dr. Coville, to visit the leading medical schools of this country, and the newest laboratories. Upon their return from an inspection of the laboratory buildings in the East they submitted a report to the trustees, and upon this report were based the plans of the architect, Mr. W. H. Miller. So admirably did they carry out their instructions, and so well did the architect follow the outlines submitted by them, that the building is to-day the best medical building for its purposes in this country. The first requirement was the provision for utility and convenience, and after the internal arrangements had been planned the architectural features were added.

The building is constructed of Ohio gray sandstone, similar to the library, and to the law school. The general form is that of an E, 157 feet long, 50 feet wide, with wings 40 feet square. It contains a cellar, basement, first, second, and third floors, and attic. It is situated on the south side of the quadrangle, east of and in line with Boardman Hall, with which it architecturally conforms. In the middle part of the E is situated the stairway and an electric freight elevator. By means of the latter, demonstration specimens and apparatus may be easily transferred from one floor to another, and the doors are so arranged as to connect the elevator shaft directly with the lecture rooms.

In the cellar are situated the cold storage, embalming, and cremating rooms, thus furnishing ample provision for the care and storage of cadavers as well as provision for disposal of the refuse from the dissecting rooms. In the cellar is also situated a large room forty feet square for aquaria, projection, etc., and several storerooms.



STIMSON HALL

In the basement, which is entirely above ground on the west, are a recitation room, a large lecture room, and the office of the departments of medicine and surgery, also the lower part of the large amphitheater. Here also are situated the cold-storage machinery and the ventilating apparatus. By means of this latter the building is splendidly ventilated, air being drawn from outdoors and forced through the building so as to change the air in the rooms every ten minutes.

On the first floor are located the cloak and lounging rooms for men and women, the college office, library, faculty room, besides the office and private laboratory of Professor Gage. Moreover, on this floor are to be found two recitation rooms, and the upper part of the large amphitheater. Adjoining the hall and connecting with it by an arch is an assembly room, the object of which is to furnish a place for students to congregate between classes and thus prevent crowding in the hallways.

The northern exposure of the second floor is arranged as one large room extending from east to west, the whole length of the building. This large room, 160 feet long, is divided in the center by a wooden partition, and each of the rooms thus formed has a small room partitioned off at one end. These partitions, since they are not a structural feature of the building, make it possible to readjust the arrangement of these rooms to meet future conditions and growth.

The second floor is devoted to the departments of histology and embryology, physiology and pharmacology. The department of histology and embryology occupies the west half of the building, and the department of physiology and pharmacology the east half. The general laboratory in histology and embryology is a room thirty feet by forty feet. The lighting in this room, which is from the north, is a special feature. The windows are of plate glass, reaching clear to the ceiling, and many of them are composed of one sheet of glass with no dividing bars. This laboratory faces the north. Around the walls are arranged the cases in which are stored the models and specimens for class use. The department is amply provided with microscopes and other apparatus. Adjoining the general laboratory on the east, is a special laboratory for the department staff, and adjoining this is a preparation room. Occupying the southwest wing of this floor is a large laboratory forty feet square for advanced students. The lighting of this room, and in fact the lighting of the whole second floor, is similar to that of the general histology laboratory. Around the sides of the research laboratory for histology and embryology are a number of small rooms for special advanced students. The general work in this department is taught mainly in the laboratory, supplemented by recitations when necessary, and by a certain number of lectures and demonstrations. For the demonstrations the department is provided with a special demonstration microscope as well as the usual projection lantern.

The east half of the north front of the second floor is occupied by the general laboratory of physiology and pharmacology. The department is thoroughly equipped and well provided with all modern apparatus. In one corner of the general laboratory is a dark room for physiological demonstrations. Adjoining the laboratory is the private laboratory of Professor Kingsbury, and next to this the preparation room and workshop. Occupying the southeast wing of this floor is the research laboratory in physiology and pharmacology. The general arrangement of this is similar to the research laboratory in histology and embryology. The work in this department is taught to a considerable extent in the laboratory, supplemented by lectures and recitations.

The third floor is occupied by the department of anatomy.

The dissecting room, 124 feet long, occupies the north and west exposure of this floor. The large room is divided up into smaller compartments by low movable partitions. This not only reduces the confusion of a large room, but the screens also furnish places for charts and blackboards. Around the walls of the room are arranged museum cases in which are stored demonstration and study specimens, all of which are available for the students and may be taken from the cases as books from a library. The room contains thirty-four dissecting tables, and numerous stands for drawing. The dissecting room is particularly well lighted by windows on the north and west sides. Over the whole of the room is a large skylight. In fact all the rooms on the third floor are beautifully lighted, not only by windows, but also by skylights. Adjoining the dissecting room on the east is a large study room, containing special preparations of bones, frozen sections, and reference books. Connected with the dissecting room is a large ice-box cooled by an extension from the cold-storage plant. In the eastern wing is situated a large room for the instructors. Adjoining the instructors' room is a small demonstration amphitheater.

The instruction in anatomy is given almost exclusively in the dissecting room. This instruction is supplemented by demonstrations.

The western wing of the third floor is occupied by the office and laboratory of Professor Kerr, and by a large research room. Connecting with the dissecting room are two locker and toilet rooms, one for the men and one for the women. In the hallways also are to be found numerous lockers.

In the attic is situated a macerating room, a photograph room, and a dark room, besides rooms for storage of glassware and supplies. There may also be found suction fans supplementing the forced ventilation from below.

The building throughout is magnificently lighted not only by windows, but also by numerous incandescent globes.

That the work given in this division of the medical college is well adapted to the present needs of the medical profession is attested by the success of those graduates of Cornell who have had their preliminary instruction in Ithaca.

CHAPTER IV

SIBLEY COLLEGE OF MECHANICAL ENGINEERING

HIRAM SIBLEY, the founder of Sibley College, was a man of marked individuality and power of thought. His whole life abounded in incidents illustrating his originality and purposeful energy. He was, in the truest sense, a "self-made man." He was born at North Adams, Mass., February 6, 1807. He had very little opportunity for early education, and left school before he was sixteen years of age. He sought to support himself in various ways, and once earned a livelihood by sawing wood for his neighbors. Upon one occasion he took refuge from an approaching storm in the shop of a shoemaker, and, while sharpening and setting his saw, watched the workmen until he was confident that he could himself make a shoe. His proposition to try was met in the same spirit by the proprietor of the shop, and his success led to his taking up the trade. Soon after this, however, he found cotton and woolen manufactures more attractive, and, when of age, had learned these various kinds of business, and had also conducted a machine shop. In 1823 he removed to Monroe County, New York, and settled near Rochester, where he became, in 1843, the sheriff of the county. He had previously made the acquaintance of Professor Morse and Ezra Cornell, and had assisted them in their efforts at Washington to secure the aid of Congress in the promotion of their plans for the introduction of the telegraph, the result of their effort being the erection of the line between Washington and Baltimore at a cost of $40,000, which sum was appropriated by Congress.

The success of the first line of telegraph led to the establishment of numerous isolated companies, which were formed with the purpose of connecting certain cities in various parts of the country. None were very successful, and Mr. Sibley saw that, to insure thoroughly satisfactory operation and financial returns, complete consolidation and the formation of a single organization covering the whole territory of the United States was essential. He had accumulated by this time considerable property, and, securing the aid of other large capitalists, he organized the Western Union Telegraph Company at Chicago, which absorbed all the lines in that part of the country, and those connecting that city with New York, and later, substantially, all the working telegraph systems of the United States. He was the first president of the consolidated organization, and under his administration it attained extraordinary success. His services were retained by the company for sixteen years, and the number of its offices increased in that time from 132 to about 4,000, and its capital from an original $220,000 to $40,000,000. He made himself and all his companions enormously wealthy by the enterprise. Among the large stockholders in various lines was Ezra Cornell. The assent of the latter to the consolidation of the small companies in which he was interested was only secured by Mr. Sibley with difficulty; but the participation thus obtained was very advantageous to Mr. Cornell, and resulted in the fortune which made possible the foundation of Cornell University; and Sibley College, one of its most important departments, was founded by Mr. Sibley with a part of the wealth which he had similarly acquired by this and other no less bold and farseeing undertakings.

Hiram Sibley

The whole system of telegraphy for the Eastern, Middle, and Southern States having been arranged, the next step was the construction of a line crossing the continent to San Francisco. This was quickly and successfully accomplished by Mr. Sibley without the aid or countenance of his colleagues in the directory of the Western Union; and the Pacific coast was soon covered with a network of wires, which were connected with the East by the transcontinental line. But Mr. Sibley was not yet satisfied, and proposed to carry his lines across the ocean, and to unite the Western with the Eastern Continent by a line across Alaska and Siberia, including a submarine cable across Behring Straits. The completion of the first line of cable across the Atlantic made this unnecessary; but not before Mr. Sibley had secured the privileges which he sought from the Russian government, and expended a large sum of money in beginning the work. To secure the needed concessions Mr. Sibley went to Europe, and was received with great distinction by the Czar and the imperial court. He spent some time in traveling over Europe, and returned to the United States satisfied with the success of his greatest undertaking, which now seemed assured. His loss in this enterprise was estimated at about three million dollars. Mr. Sibley retired from active participation in the business in 1869, and became interested in farming and seed-raising on a large scale. He bought the Sullivant farm of forty thousand acres in Illinois, which he divided into 150 or more small farms, and rented them to selected tenants, after having supplied each with good buildings and a complete system of under-drainage.

Mr. Sibley died at Rochester, July 12, 1888, at the age of eighty-one, after a short illness which terminated in apoplexy. His health had been failing for some years. He had, however, attended to business without interruption, and only laid aside the management of his vast interests at the very last. Throughout his whole later life he was intensely interested in the promotion of the prosperity of Cornell University and of Sibley College. He attended every meeting of the Board of Trustees, of which he was a charter member, and he never hesitated to give time, thought, and pecuniary assistance when needed. At one time, when the university was greatly embarrassed by a debt of $155,000, it was relieved by a generous gift of the entire sum by Messrs. Cornell, McGraw, Sage, Sibley, and White. The money thus contributed was afterward set aside by the university as a fund for scholarships and fellowships, which bear the names of these noble benefactors.

Sibley College, so named in honor of its founder, the Hon. Hiram Sibley, of Rochester, N. Y., since deceased, is the School of Mechanical Engineering and of the Mechanical Arts in Cornell University.

Provision for a department of mechanic arts, as required by the charter and by the Land Grant Act, was made upon the opening of Cornell University by the appointment of Professor John L. Morris, a graduate of Union College, as professor of practical mechanics and director of the shops. Professor Morris, in addition to special training under Professor William L. Gillespie, a graduate of West Point and one of the first professors of civil engineering in this country, and Professor Isaac W. Jackson, whose reputation in the departments of mathematics and of natural philosophy made him one of the most prominent of the earlier scholars in that department, had had a valuable experience along practical engineering lines. Although the department of mechanic arts represented one of the two great lines of activity which were to be fostered by the Land Grant, no preparation was made for

SIBLEY COLLEGE

John Lewis Morris

William Frederick Durand

Rolla Clinton Carpenter

its equipment until after the opening of the university.

There were no shops, laboratories, drafting-rooms, or models of machinery to prepare for successful work in mechanical lines, and for the first two terms so little provision was afforded for instruction that the attention of the professor was devoted entirely to instruction in mathematics and, for a time, in physics. For lecture- and class-room needs a single room in Morrill Hall was at first shared in company with other professors. Somewhat later, in the winter of 1869, the department of mechanic arts found temporary quarters in the newly finished chemical laboratory, and was here housed until as a department it became the nucleus for the development of Sibley College, and thus found permanent quarters in the buildings erected for the purposes of this foundation.

Sibley College dates from the year 1870, in which year Mr. Sibley began a series of contributions to the treasury of the university, which have culminated in this great institution. The first building was begun in the summer of that year, a stone structure 100 feet in length, 40 feet in width, and three stories high, in which not only the College of Mechanic Arts was established, but other departments of the university, including the printing establishment and the department of botany.

This building was lengthened in 1884-85, thus giving a main structure 165 feet in length. Extensive workshops were also added in a separate structure one story in height, and embracing approximately a similar ground floor area. Attached to the latter were a janitor's house and suitable store and toilet rooms. A few years later a second story was added to the workshops, thus doubling the capacity of this structure, while a frame building 40 × 140 ft. was added in the rear for blacksmith shop and foundry. The last addition made by the founder to the buildings of the college was an extension of the workshops, erected in 1888, and consisting of a two-story structure 100 feet in length by 40 feet wide, in which were placed, for the time, the equipments and apparatus of the laboratory of experimental engineering and research.

After the death of the founder, his son, Mr. Hiram W. Sibley, succeeded to the trusteeship vacated by his father, and to the guardianship of the college. The work thus begun by the father was continued by the son, by the erection, in 1893-94, of a second main building 165 feet long, 50 feet in width, and three stories high, with a lofty and well-lighted basement. The general arrangement of the new building in reference to the old was in accordance with a plan which had been prepared by the architect for the founder, as a guide in further extensions, and which he approved only a brief period before his death. In the further development of this plan, Mr. Hiram W. Sibley in 1901 gave funds for the erection of a central structure about 80 feet square, and lying between the two earlier main structures as east and west arms. This central body is surmounted by a massive dome, and contains a large auditorium, museum, and reading-room, with commodious and well-lighted basement for lockers and miscellaneous purposes.

The total amount of floor space thus provided, and inclusive of basements used for laboratories and storeroom purposes, is about 112,000 square feet, divided among lecture- and class-rooms, offices, drawing rooms, shops, and laboratories.

The accounts of Mr. Sibley show in behalf of Sibley College a total disbursement amounting to above $150,000. These include the cost of the building erected in 1870-71, the first in the Sibley College group,

SIBLEY TABLET

$36,160; a complete set of the models of kinematic combinations and mechanical movements by Dr. Reuleaux, in 1882, $8,000; an endowment fund for the professorship of mechanic arts, in 1885, of $50,000; buildings added in 1885-88, $63,367.44; total, $157,527.44; and the sum of $20,000 given to the university in 1873, and later devoted to the establishment of scholarships and fellowships, thus making a total of $177,527.44. The cost of the second main building was $54,000, and of the central structure or dome $80,000, thus making a total expenditure to 1903 of something over $300,000. The university has expended, besides, about $25,000 on the buildings and accessories, and large sums in additions to the equipment, which, through the generosity of Mr. Sibley and other friends of the institution, has risen to a total value of above $200,000, thus making the total inventory of the college and its outfit in all departments in 1904 about $500,000.

The growth of the instructing corps in the department of mechanic arts was at first very slow, corresponding to the limited means which were placed at its disposal. At its opening in 1868-69 one professor was assigned to the subject of " practical mechanics," industrial mechanics constituting a part of the title of the professor of physics. In 1872-73 an assistant professor of mechanical drawing was appointed. In 1873 John E. Sweet was appointed master mechanic and director of the machine shop. He remained a teacher in Sibley College until 1879. Professor Sweet not only gave instruction in machine-shop processes, but also through informal talks trained the students in right ideas of machine design and general engineering. Everyone who was fortunate enough to have been his student recognizes how great his work was for the building up of Sibley College. He was the first to recognize that the machine shop in connection with a technical school should teach principles of construction primarily and handicraft secondarily. Mr. Edward Le Baron Gardiner served as instructor in mechanic arts (1875-76) and as assistant professor (1879-80), and Mr. Walter C. Kerr as instructor (1879-80) and as assistant professor (1880-82). Samuel Wilberforce Powel was professor of practical mechanics and director of the machine shop (1879-80) during the absence of Professor Morris in Germany (1879-80). From 1869 to 1873 Mr. John Stanton Gould lectured annually on mechanics as applied to agriculture. For some years following, the staff remained substantially the same in number, as did also the distribution of work, fluctuating slightly as the number of students varied from year to year.

By an act of Congress of February 26, 1879, entitled "An Act to promote a knowledge of steam-engineering and iron-shipbuilding among the students of scientific schools or colleges in the United States," it was provided that officers of the engineer corps of the navy might be detailed as professors in scientific schools or colleges. In accordance with this law, Sibley College has enjoyed three valuable details—that of Mr. Walter Martin McFarland, assistant engineer, United States Navy, as assistant professor of mechanical engineering, from 1883 to 1885; Frank Harvey Bailey, passed assistant engineer, United States Navy, assistant professor of mechanical engineering, from 1885 to 1888, and Alfred Bruce Canaga, passed assistant engineer, United States Navy, as assistant professor of mechanical engineering and instructor in marine engineering, from 1888 to 1891.

Professor John Burkitt Webb filled the position of applied mathematics and theoretical mechanics from 1880 to 1885.

It was not until 1885 that a complete reorganization

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SIBLEY COLLEGE

of the institution, so as to constitute a complete college of mechanical engineering and the mechanic arts, was made, with a single supervising head and a definitely planned schedule of work and distinctly assigned duties for its officers. This reorganization of Sibley College began with the appointment in 1885 of Professor Robert Henry Thurston as director of the college, with powers and responsibilities as specified in the following university statute:

" The college is placed by the trustees in the special charge of a director, who shall have control of the whole workings of the college, shall recommend to the president all persons for appointment as professors, assistant professors, instructors, foremen, engineers, and other employés in the college, and be responsible for their efficiency; shall be the custodian of the buildings, tools, machinery, models, apparatus, and other property and chattels of the college; shall be responsible for their proper use and preservation, and for the efficiency of the motive power and the power for furnishing light and heat; shall control and direct the instruction of students, and the labor of the employés; and within the means placed at his disposal shall do all he can to promote the prosperity of the college and university. He shall make an annual report to the president on the condition and needs of the college, and from time to time shall make such other reports and recommendations as may seem to be called for."

The results of this reorganization of the college were quickly seen in the increased number of students, and in a no less rapid growth and improvement in the courses of instruction offered and in the quality of the student-body.

The following table will show the growth of the college during these years as determined by the number of students and by the number of graduates for each year of the period:

For College Year Ending June	Candidates for M. E.	Candidates for M. M. E.	M. E. Degrees Given	M. M. E. Degrees Given
1885	63	—	0	0
1886	106	—	8	1
1887	168	—	19	0
1888	219	—	16	2
1889	283	—	32	1
1890	346	13	54	6
1891	425	14	52	3
1892	500	19	84	6
1893	546	27	93	14
1894	571	18	81	16
1895	501	34	87	8
1896	496	17	109	15
1897	473	9	125	6
1898	451	11	93	2
1899	484	12	89	7
1900	541	9	99	4
1901	633	16	110	10
1902	780	15	110	4
1903	885	18	157	7
1904	958	20	140	6

The total number of students for the year 1903-04 is 958, and the number in the instructing staff 45, giving in the aggregate about 22 university hours of instruction per week, or, reduced in the entire college as a unit, about 500 student-hours per instructor.

At the present time Sibley College is organized into seven departments, which are administered as follows: Director of the college, Professor Albert W. Smith; Mechanic Arts, Professor D. S. Kimball, head of department; Machine Design, Professor Forrest R. Jones, head of department; Experimental Engineering, Professor R. C. Carpenter, head of department; Steam Engineering, Professor Albert W. Smith, head of department; Electrical Engineering, Professor H. J. Ryan, head of department; Department of Naval

ALBERT WILLIAM SMITH

(Director of Sibley College)

Architecture and Marine Engineering, Professor G. R. McDermott, head of department; Department of Railway Mechanical Engineering, Professor H. Wade Hibbard, head of department.

A brief sketch of the development of these departments will serve to show the trend of progress during the years 1885-1904, and the relation of these various lines of work to the earlier foundation laid between 1870 and 1885.

The department of mechanic arts is the parent department of the college, and was organized with Professor J. L. Morris as its head, a position which he filled after his appointment in 1868 until 1904. This department has stood from the first for that broad field of practical work in which the student becomes familiar with the art of constructive engineering. The designer develops by formulæ and drawing-board methods a geometrical ideal representing some mechanism or piece of engineering construction. To become of use this ideal must be realized in material form. It must be clothed with the actual materials of engineering construction, and it is this broad field of engineering practice which is represented by the work of this department. The work is divided for convenience into four main branches: woodwork (comprising carpentry, wood-turning, and pattern-making), forging, foundry work, and machine-shop work. Within these four main fields of work the student is familiarized with workshop processes, with shop equipments and tools, with constructive processes, and at the same time acquires such a degree of actual manual skill as the time assigned to this subject will permit.

The time required in this department for students in all regular courses covers about twelve per cent. of the total time. The inventory value of the equipment of this department is about forty thousand dollars, and the teaching force required comprises one professor and eleven instructors.

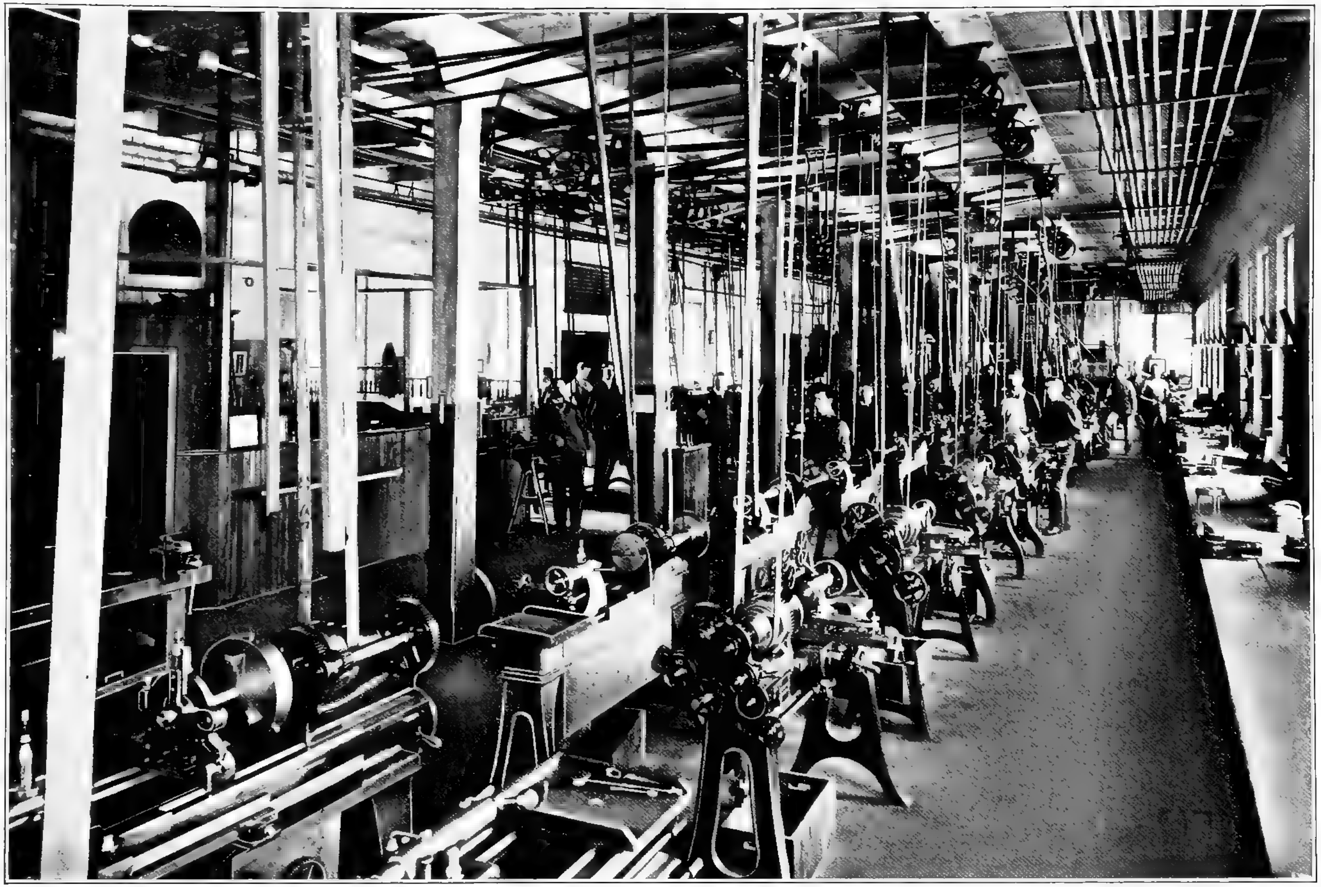
The work of the department of steam engineering (formerly the department of mechanical engineering) at present comprises the general study of thermodynamics and heat engines, including the generation of steam in steam boilers and the principles of its use in the steam engine, the gas engine, and steam turbine as modern forms of prime movers, compressed air and its uses, mechanical refrigeration, etc. While this general line of work traces back to the earlier years of the college, it was much strengthened and broadened in 1885, when the late Director Thurston assumed charge, and for the eighteen years of his work in Sibley College this general subject formed his own personal work as lecturer and teacher. In the earlier years of the college and down to relatively recent times the department of mechanical engineering was considered as comprising likewise the study of the constructive materials of engineering, together with the general field of design. About 1897, however, these latter lines of work were transferred, the former to the department of experimental engineering, and the latter, as noted below, was recognized more distinctly as a separate department of the college. The senior courses offered at present are given by the director of the college, and the junior courses by an assistant professor under the director's general charge. The work in this department required of the regular candidate for the degree of M. E. covers about eight per cent. of the total time. The inventory value of the equipment of the department is at the present time about five thousand dollars. The work of the department of industrial drawing and art dates back to the first years of the college. Instruction in drawing was given by

Professor Morris and his assistants from the earliest organization of the work when housed in the original chemical laboratory. In 1873 Professor E. C. Cleaves was appointed in charge of free-hand and mechanical drawing, and served as head of the department for this general line of work until 1904. In 1902, however, the mechanical drawing was transferred to the department of machine design, thus leaving to the parent department the more unified work of free-hand drawing and industrial art. In 1904 the department of industrial drawing and art was transferred to the College of Architecture. During this period, and under the direction of Professor Cleaves, the scope of the work has grown widely, and the courses now offered cover instruction in free-hand drawing for students in Sibley College and in the College of Agriculture, as well as industrial and fine-art courses in crayon, pen-and-ink sketching, water-color, and clay-modeling. The work in this department required in the regular course for the degree of M. E. is about four per cent. of the total time.

Altogether six courses are offered, requiring a teaching force of one assistant professor as head of the department and eight instructors. The present inventory value of the equipment of the department is about six thousand dollars. The department of experimental engineering as a distinct line of work dates from the reorganization of the college under the late Director Thurston in 1885. The importance of the engineering laboratory as a factor in engineering education had early been recognized by Professor Thurston, and at Stevens Institute, where he organized the department of mechanical engineering at the founding of the institute in 1870, and served as its head until his call to Cornell in 1885; he early introduced the laboratory method and organized a definitely established mechanical laboratory course of instruction, probably the pioneer course of its kind in the country.

The same ideas were applied at Sibley College, and in the register for 1886-87 definite announcement is made of mechanical laboratory instruction, and the list of teachers contains the name of Frank Van Vleck as instructor in charge. In 1887 the work in experimental engineering was given into the charge of Assistant Professor A. W. Smith (1887-1890), and he in turn was succeeded in 1890 by Professor R. C. Carpenter, who has served as head of department from that date to the present time. During this period the course of instruction has been broadened and the equipment of the department has been multiplied many times. In this department the student studies the valuable properties of the actual materials of engineering construction, and deals experimentally with various forms of prime movers and mechanisms of various kinds and for various purposes. The leading purpose of this work is, on the one hand, the development of general familiarity with these prime movers and mechanisms and with the materials of which they are constructed, and, on the other, the study of the most approved methods of testing the properties of such materials and the economic performances of the various prime movers and mechanisms with reference to the specific purposes for which they are intended. At the present time the inventory value of the equipment of this department is about $100,000, and the courses of instruction which it gives comprise about eight per cent. of the total time of instruction required for the undergraduate degree. The number of courses offered is six, requiring a teaching force of one professor, one assistant professor, and nine instructors and assistants.

The first mention of electrical engineering in Cor-



MACHINE SHOP, SIBLEY COLLEGE

nell University is found in the register for the year 1883, where, as a general university announcement, attention is called to the opportunities for special work in these lines which were to be immediately offered to those desiring to qualify themselves for usefulness in this rapidly growing field of engineering work. In 1886, in the announcement relating to Sibley College, more definite statements were made, and further attention was called to the instruction offered along these lines. In 1887 the work was given more definite form by the appointment of Professor E. P. Roberts, who in 1889 was succeeded by Professor H. J. Ryan, who has served as head of the department since that date. In the course of these years the scope of the instruction given in this department has greatly widened and now comprises ten per cent. of the required undergraduate course in electrical engineering, with a large number of graduate and elective courses in addition. The total number of courses offered at present is eleven, and the teaching force required comprises one professor, one assistant professor, and one instructor. The inventory value of the equipment of this department is about $12,000.

The department of machine design acquired in 1897, under Professor J. H. Barr, a more definite status as a separate department of the college. Previous to this time it had been considered as a part of the general department of mechanical engineering, though for many years it had had a continuous and substantially independent administration under able teachers, with an assistant professor in charge. This general line of work, dealing, as noted above, with the problem of the development of a design or geometrical ideal of a mechanism or other piece of constructive work by the aid of formulæ and geometrical processes, traces back likewise to the earliest years of the college, though naturally as the years have gone by they have brought added character to the instruction given and wider scope to the courses offered.

The total number of courses now offered in this department is eleven, for which a teaching force of one professor, two assistant professors, and six instructors is required. The courses in this department in the regular work required for the degree of M. E. comprise about ten per cent. of the total required time. The inventory value of the equipment of this department is at the present time about $40,000.

The School of Marine Engineering and Naval Architecture was authorized by the University Board of Trustees in 1890, and the special work contemplated was begun in the fall of 1891 with the appointment of Professor W. F. Durand as principal, or head of the department, which position he occupied until his resignation in July, 1904.

The purpose of the instruction in this department is to familiarize the student with the special engineering problems which arise in connection with the design of steamships and of their propulsive mechanisms, and to equip him for usefulnesss in this specialized field of engineering work.

For the student specializing in this line of work, the time required in this department constitutes about twenty per cent. of the total time of the course. Altogether some ten courses are offered, for which a teaching force of one professor and one assistant professor is required. The inventory value of the equipment of the department is at present about $5,000.

The School of Railway Mechanical Engineering was authorized by the University Board of Trustees in 1896, and the work of the department was organized in 1898 by the appointment of Professor H. Wade Hibbard as principal, or head of department, which position he has occupied since that date.

The purpose of the instruction in this department is to familiarize the student with the special engineering problems which arise in connection with the design and construction of locomotives and railroad rolling stock, and with their operation and maintenance under the most economic conditions.

For the student specializing in this line of work the required courses constitute about fourteen per cent. of the total time of the course. Altogether, six courses are offered, all by the head of the department. The inventory value of the equipment of the department is about $5,000.

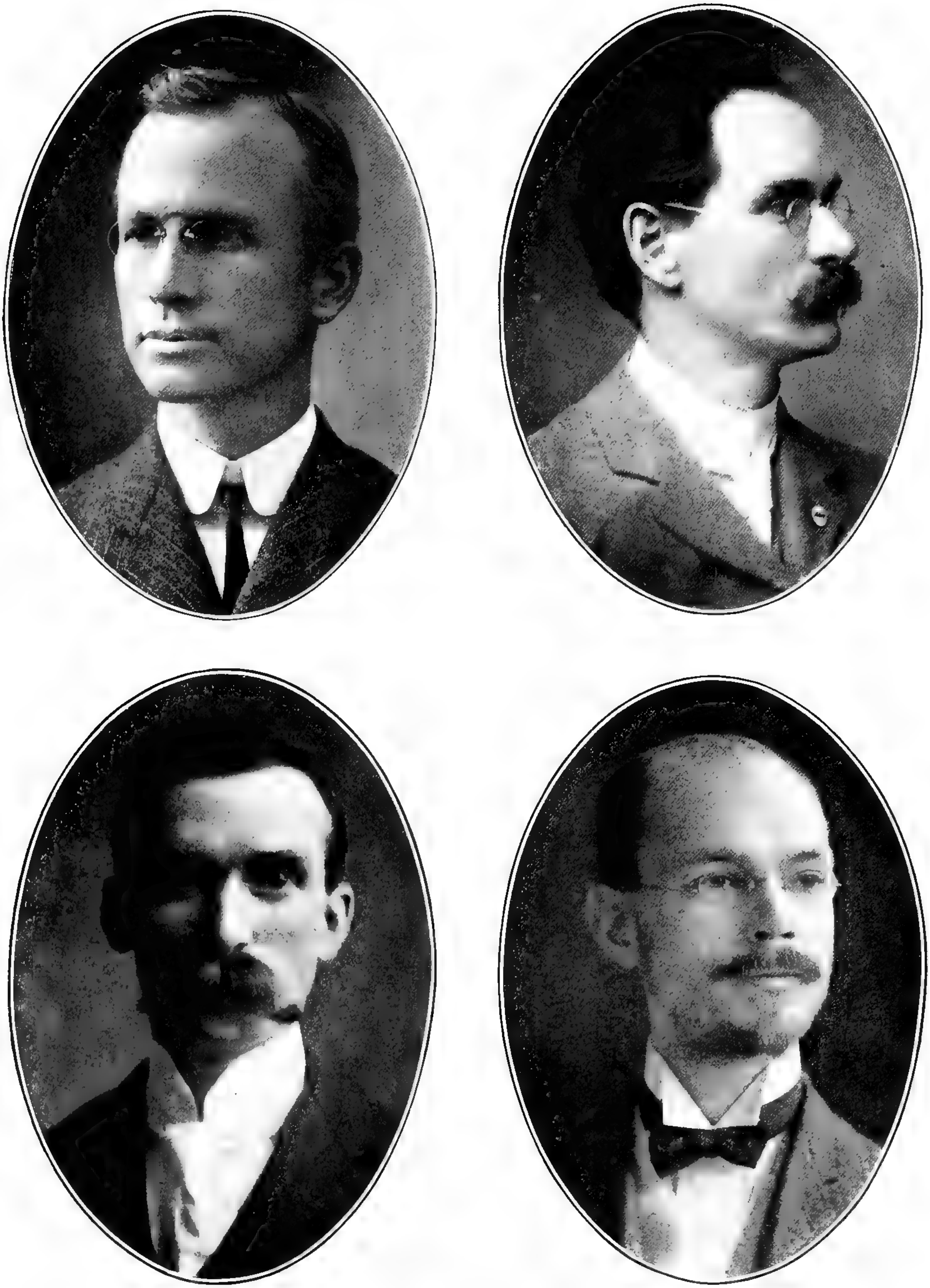
In 1896, when the various colleges of the university were given responsible charge of the details of their work, the administration of Sibley College, in all matters except those involving questions of general university policy, became vested in a faculty of mechanical engineering, with the director of the college, Professor Thurston, as its dean. Since that time the faculty of mechanical engineering has administered all matters in Sibley College relating to entrance requirements, curriculum, and requirements for graduation, and has in general determined all scholastic and educational matters relating to the undergraduate courses of study.

As an aid in caring for the large amount of administrative detail which this work naturally entails, Professor W. F. Durand was appointed in 1896 as secretary of the faculty, and was authorized to share with the director in such administrative duties as might be mutually agreed upon. This position was held by Professor Durand, with a gradually increasing share in the general administrative work of the college, until the death of Director Thurston, in 1903, when Professor

Durand was made acting director for the remainder of the year.

Director Thurston, in his report for 1901-02, says:

“The demand from the business men of the country for graduates of Sibley College was for a long time sufficient to take care of all sent out into business, but of late this demand has been far in excess of our ability to meet. The calls for men of professional training, supplemented by some business experience, even though very limited, in any ordinarily prosperous times, may be relied upon in the future to take care of all the men graduated. A census of graduates shows that more than fifty per cent. of them already occupy positions of responsibility and control. The total number of alumni of Sibley College is now about thirteen hundred. The great mass of these alumni have left college since 1890. Of these graduates, about 900 have reported their present positions and something of their history, although reports from the remainder are slowly coming in. Of these 900, about 250 are engaged in miscellaneous manufactures, 110 in electrical manufactures, 90 are teachers, 50 are in railway work, as many more in heat-engine construction, and others in heavy machinery construction and the steel manufacture in about equal numbers. Nearly 50 are contracting engineers, 65 in electric railway and electric-light work, 35 in telegraph and telephone companies, 23 in consulting engineering and expert work, 31 in naval construction and engineering, and 15 in the supervision of engineering plants. About 40 have gone into branches of business allied to mechanical engineering more or less closely, and the balance are engaged in a great variety of other vocations, mainly, however, professional. Very few have found it either necessary or desirable to abandon the profession. Of the total heard from, 10 are presidents of companies and 500



SIBLEY COLLEGE

Harris Joseph Ryan
Dexter Simpson Kimball

Herbert Wade Hibbard
Henry Hutchinson Norris

or more are in positions of responsibility and control, exclusive of the alumni engaged in teaching. Of the latter, about two-thirds are professors or principals. There are 8 alumni in the army and the navy and revenue marine, and 12 in the United States Patent Office. Of the 35 in the telephone business, 21 are engineers or superintendents. In the electric light and power companies, 59 of the 65 are in the superior positions, usually as superintendents or general managers. In electrical manufactures, of the 111 reporting, 76 are in similarly responsible places. Of the 30 reporting from the shipbuilding establishments, practically all of whom are recently out of college, six are superintendents, general managers, proprietors, or engineers having charge of work. The 44 men in the contracting business are, with the exception of 4, all in responsible positions or members of firms. Of the 250 in miscellaneous lines of business, over 180 are proprietors or officers of the establishments in which they are engaged. Of the 50 engaged in railway work, one-third are apprentices, one-third are responsible officers, usually ' mechanical engineers ' of the corporations, and the balance are commonly designers and draughtsmen and in positions offering good opportunities to learn the business and to advance.''

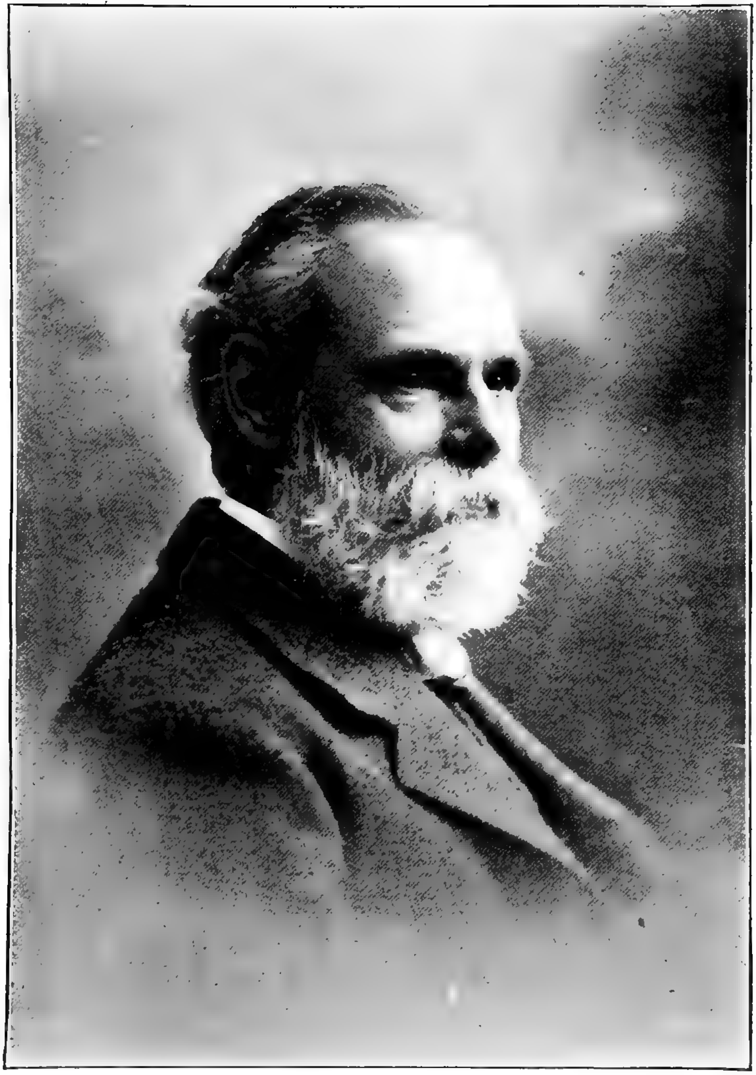
In the spring of 1904 Albert W. Smith was appointed director of Sibley College, and at the beginning of the following year some few changes were made in the organization. Dexter S. Kimball was appointed professor of mechanic arts to succeed Professor J. L. Morris, who became professor emeritus. Carl C. Thomas was appointed to take charge of the work in marine engineering, formerly given by Professor Durand. The department of industrial drawing and art was transferred to the department of architecture, and the complete course in drawing for Sibley College students was given into the charge of the department of machine design.

Professor Robert Henry Thurston

On October 25, 1903, Professor R. H. Thurston, director of Sibley College and dean of its faculty, died died suddenly and in the midst of the great work of development and administration in which he had been engaged since the reorganization of the college in 1885. His career as an engineer, scientist, educator, and scientific author furnishes a most notable example of the highest measure of professional success, based upon a just combination of native capacity, industry, tireless activity, and devotion to the principles of scientific truth. Among the tributes from his colleagues was the following:

" Professor Thurston owed his distinguished success to a rare combination of noble qualities, the absence of any one of which in human character impairs achievement, even where intellectual eminence and scientific ability are unquestioned. He had the unusual gift of presenting the results of scientific investigations in a manner which, without distinctly popularizing the subject of which he treated, made the results attained useful and effective to all students in his especial department of study. He possessed organizing ability of a high order, and contributed in a marked degree to draw out the best qualities of all associated with him in his department. In this respect he was like a great general who recognizes the special gifts of his subordinates, and then places every man where he can achieve most in his distinctive sphere. He saw that individuality was sacred, and that no success was possible save as the fullest opportunity was given for individual development.

" Everyone associated with him felt how generous



ROBERT HENRY THURSTON

and how keen was his recognition of their efforts, how swiftly he discerned merit, and how enthusiastically he bestowed public praise upon the work of silent scholars who labored in secret and were astonished when the attention of the world was called to what they had wrought. He possessed a cordial and generous nature, which revealed itself as the friend and well-wisher of all. He possessed a valuable preparation for his work in his earlier devotion to literary study. He possessed a sympathetic interest in all fields of thought, and was thus brought into intimate and delightful contact with scholars in diverse branches of study. He laid stress in all his public addresses upon the highest culture of the individual as essential to success, even in the narrow practice of a profession. Those of us who were students of literature always found a sympathetic appreciation of our aims and a ready co-operation with us. He could say as did Goethe: ' Many paths my feet have wandered, that of envy left untrod.'

" The possession of all these gifts might have been enjoyed, but Dr. Thurston would have lacked one distinguished quality had he not possessed in an eminent degree the gift of friendship. This enriched his beautiful home life and was the charm of his personal intercourse. The young went to him with confidence and always found a ready listener and a wise adviser. The range of his generosity only those can know who enjoyed personal association with him in the period of the eighteen years in which he resided here.

" That fatal ' Cæsarean madness,' which destroys all the finer qualities in its selfish grasp of absolute power, which is at once so seductive to one in authority and so destructive of all nobler intercourse, was absolutely alien to his spirit. He loved, as all men love, generous recognition, and his colleagues recognized the greatness of a nature which was at once so simple and so true. It may be said of him that he placed no burdens in men's way, but made life for all easier and brighter.

" In his summer vacations by the sea the sailors of the New England coast found him a companion whose great attainments only made more attractive his frank personal intercourse. He loved to talk with common men and to learn the special knowledge which each possessed. Men felt that he was genuine, and this was what attracted such diverse natures to him.

" He has passed from his work here in the fulness of his powers, when new achievements were still possible, and when his plans for the enlarged growth of his college were only partly realized. No loss from among our number will attract wider notice among scholars of foreign nations, and no personal loss to the university will be more deeply felt among his colleagues and the alumni, than that of Dr. Thurston. It is the hope of the university that his grand aims for his college will be carefully realized and that the college of the future may be his enduring monument."

Dean Huffcut wrote:

" We have rarely seen our university community so profoundly moved by the death of one of its members as now by the death of Dr. Thurston. The esteem inspired by him was well-nigh universal. His uprightness of character made him everywhere trusted. His genuine kindliness and sympathy touched the better nature of all who came into contact with him. Notwithstanding an inherited New England reserve of manner, no one could know him for long without perceiving how quick was his sympathy and how instant his helpfulness. His intellectual and executive powers were remarkable. Even the casual acquaintance could not but be struck by a rare blend of qualities. To the serenity of the philosopher he united the activity and energy of the captain of industry. There was, moreover, in all that he said and all that he did a sweet reasonableness that captivated all open minds. Those who came to know him best admired and esteemed him most highly, and his friends had for him an affection that increased with the years. His loss to the university is great; to his friends it is irreparable.''

CHAPTER V

THE COLLEGE OF CIVIL ENGINEERING

THE first professor chosen to the chair of civil engineering was William Charles Cleveland. Professor Cleveland was a graduate of the Lawrence Scientific School; a scholar accomplished in several departments of science, an excellent botanist and geologist, gifted in his own profession, and an enthusiastic and inspiring teacher. He left his impress upon the students whom he taught during the first four years of the history of the university. The *Era* of that day pays a beautiful and pathetic tribute to his memory. It says: "How shall we adequately describe him, claiming as he did to a degree rare as it was beautiful, veneration as a professor, esteem, and profound respect as a friend? Of his scholastic acquirements we need not speak. The extent of his studies was only equaled by his thoroughness. An erudite mathematician, an ardent geologist, thoroughly conversant with literature, language, and science in almost every department, and proficient in sculpture and music, he was indeed a rare example of thoroughness and widely diversified scholarship. He aimed to make his department at Cornell the best of its kind in the country, and he succeeded to a wonderful degree." President White said of him: "He was a builder, and his ambition was nothing less than to build a great college of engineering which should be known throughout the United States, and be a tower of strength for the university. In all this he planned most sagaciously, and labored most devotedly. Against all persuasion to lower the standard of scholarship in his department, he insisted on holding it high, maintaining that this was the only policy which would give it permanent success. The originality of his methods and the extent of his knowledge were a constant surprise to his associates. On the practical side of his department he was admirable. In the construction of models for illustration he showed very great skill, nor was his skill entirely mechanical or mathematical; he showed a capacity for work in art, which, if carried out, would have certainly brought him high reputation. The sketching of a landscape that pleased him, the modeling of the bust of a brother professor whom he loved, these were pastimes with him.''

Soon after the death of Professor Cleveland in 1873, Professor Estevan Antonio Fuertes, a graduate of the Conciliar College of San Ildefonso, Spain, and of the Troy Polytechnic Institute in this country, was called to be his successor. Professor Fuertes was a scholar of thorough literary as well as scientific training. He had been the engineer in charge of the Nicaragua canal survey for the United States government, and had wide experience as a consulting engineer in New York. Many students were attracted by the civil-engineering work and most excellent results were obtained, but of rather an elementary character, as the technical work was not taken up until the junior year, and Professor Cleveland was alone up to 1871 and had only a portion of the time of two assistants at the time of his death. At this time the quarters of the department were in two rooms, a classroom and a draughting room on the second floor of the north wing of the temporary wooden chemical building. The instruments were kept in a small room at the head of the stairs.

Professor Fuertes took up the work in the fall of 1873, and labored alone, except for an assistant in descriptive geometry, until the third term of the year, when an instructor was appointed. His efforts were directed to bringing the men into closer touch with engineering practice, and to interest them in their chosen profession earlier in the course. As opportunity offered, additional technical subjects were added and the engineering work entered upon in the sophomore and freshman years. In remodeling the course, the duty of raising both the social and professional standard of engineering was kept constantly in mind. Progress was at first slow, owing to lack of resources and the absence of the proper university atmosphere for the prosecution of technical and professional studies. As the university broadened, sympathy with and appreciation of intellectual activity in every field became all-pervading. The plain wooden building bearing the name of the Chemical Laboratory, which furnished scant accommodation at the opening of the university for the sciences, and afterwards for the school of civil engineering, was gradually vacated until the entire building was devoted to civil engineering. The growth of the department was maintained during the depressing years which followed the financial crisis of 1873.

The trustees suddenly changed the cautious policy which they had pursued as regards appropriations. The need of a vigorous development and of wise and enthusiastic leadership was felt throughout the university. The trustees felt that to inspire new life into all departments, additional appropriations must be made, even if the capital of the university was temporarily impaired. At a single meeting, December 18, 1880, one hundred thousand dollars was appropriated to equip certain departments in the university. In the summer of 1880, Professor Fuertes, as dean of the department, purchased in Europe the nucleus of the present equipment of models, instruments, photographs, and laboratory apparatus. This has been constantly added to until, considered in relation to the entire equipment of the university, it can be called among the best in the world.

Owing to ill health Professor Fuertes resigned from active work in the college in November, 1902, and his death followed in January, 1903. He had seen the department of 1873 with only one professor develop under his wise leadership into a college with a faculty of eight professors and eight instructors. Two medals bearing his name, and endowed by him, are awarded annually in the college.

Believing that much of the field work in surveying could be better done in the field than on the campus, the survey of the lakes of Central New York was begun at Cayuga in the spring of 1874, the seniors and juniors spending two weeks on a geodetic and hydrographic survey of Cayuga Lake. The work of these surveys was inaugurated by Professor Fuertes for the purpose of placing the student in touch with broader and more comprehensive problems of surveying than could be compassed in the time allotted to field work within the limits of the campus. The manipulation of field instruments as an art, while in no sense neglected, was very carefully correlated to the no less important problems of organization and administration of large operations, and these problems were to a great extent left for solution to the students themselves. The general plan at the time of its inception was an untried one in this country, but Professor Fuertes lived to see his judgment of its value vindicated by its adoption by practically every engineering school of repute. His own experience as an engineer-in-chief of the United States Ship Canal Expedition for the survey of the Isthmus of Tehuantepec and Nicaragua had given to him a profound impression of the importance of a broad training in the profession.

The following tabulation gives an idea of the extent and distribution of this work:

Cayuga Lake, . .	1874–78	Skaneateles Lake, .	1890–94
Seneca Lake, . .	1878–83	Owasco Lake, . .	1894–96
Keuka Lake, . .	1884–88	Otisco Lake, . .	1897
Canandaigua Lake, .	1888–90	Fall Creek Watershed, since	1898

Much of the data obtained has been used by the United States Geological Survey in the preparation of its topographic sheets, while there has been a large demand for the printed maps. The results of the surveys of Cayuga, Seneca, Keuka, and Canandaigua lakes were published by the state of New York, but later work by the college has not been published, owing to the fact that the United States Geological Survey has covered and mapped the territory in which this later work was done.

The period of field work has since been extended to four and a half weeks, and the work begun immediately after the close of the university year, in the summer vacation, and the survey limited to the junior class.

During the early years of the university, from 1868 to 1873, the first two years of the four-year course were nearly identical with those in various other technical courses, and with that in the general course in science, and comprised mathematics, physics, chemistry, history, English, and a foreign language. Only the third and fourth years were devoted to professional studies. Hence the student was not compelled to make a choice among the technical courses or the course in science until the end of the sophomore year.

On taking charge of the department of civil engineering in 1873, after the death of the lamented Professor Cleveland, Professor Fuertes instituted changes in the course by which one or two of the minor technical studies should occur during the sophomore year, thus gaining time later for other technical topics not previously given in the course, such as geodesy, practical astronomy, and geology. Gradually a greater diversification was given to the technical work in conformity with the increasing variety in the demands of engineering practice in the world at large and in the United States in particular.

As years went on it was found feasible to raise the entrance requirements from time to time and thus secure still more opportunity for the introduction into the course of topics tending to broaden the scope of the student's experience.

In 1885 the name of the degree given for the successful completion of the course in civil engineering was changed from that of Bachelor of Civil Engineering to that of Civil Engineer; and in 1889, when the department moved from the old wooden building into the new quarters in Lincoln Hall, regular laboratory practice in civil engineering was fully inaugurated, viz., work in testing materials, with geodetic instruments, in sanitary laboratory work, in mineralogy, and in hydraulic experimentation, the opportunities for this last being much amplified by the completion of the Fall Creek laboratory in 1898.

In 1898 the entrance requirements had been sufficiently raised to make it feasible for students to complete the study of analytical geometry and the calculus by the end of the first year of the course. Mechanics of engineering was therefore placed in the sophomore year, thus enabling the students to take up hydraulics and the study of structural design in the junior year. This opened the way for additional, or more widely extended, professional studies in the senior year, among which have now been placed courses in engineering problems and electrical and steam machinery;

the instruction in the last two being furnished by professors in Sibley College.

Until the year 1897-98 the same course of study had been rigidly prescribed for all students in civil engineering, but in that year a certain range of choice was offered among various elective courses, both of classroom and laboratory work, among these being special advanced courses in bridge engineering, railroad engineering, mechanics, sanitary engineering, masonry and foundations, and mining engineering; also special laboratory work in testing materials and in hydraulics, and in sanitary investigations.

In this way the four years' course of study for the degree in civil engineering has reached its present position.

The ideal toward which Professor Fuertes was working in his development of the course in civil engineering at Cornell University could not perhaps be better expressed than in his own statement:

" The courses of instruction have been planned with a view to laying a substantial foundation for the technical and general knowledge needed by engineering practitioners, so that graduates may become professional experts in course of time; and that, guided by their theoretical knowledge and as much of engineering practice as can be taught in schools, they may develop into useful investigators and constructors. This department aims to make its graduates cultured and well-balanced professional men, trained to meet the actual demands of American engineering science and practice."

As the course of study in civil engineering was first planned it had the merit of providing a good foundation for engineering study in mathematics, descriptive geometry, theoretical mechanics, and hydraulics, but there was practically no professional study except what is now regarded as of the most elementary character. In fact, only eight courses were taught that were not included in the course of study for students in arts and sciences.

The strictly professional subjects, which do not include surveying, geodesy, astronomy, drawing, theoretical mechanics, and hydraulics, covered only about one-fourth of a year's work in the entire course in 1868-69. Taking that as 100 per cent., the professional work in 1874-75 was 200 per cent.; in 1890-91, 300 per cent.; in 1900-01, 515 per cent., and in 1903-04, 665 per cent. The work in general science was increased more than 50 per cent., and in the remaining subjects about 30 per cent. The amount of work done in the entire course, on the basis of university hours, has been increased more than 50 per cent. Besides this the work of an entire year has gradually been demanded in advance in the requirements for admission.

In 1904 forty-four courses were given in the college, of which four are given exclusively to students in other colleges. The teaching staff consisted of one in 1868-69, two in 1874-75, nine in 1890-91, thirteen in 1900-01, and nineteen in 1904.

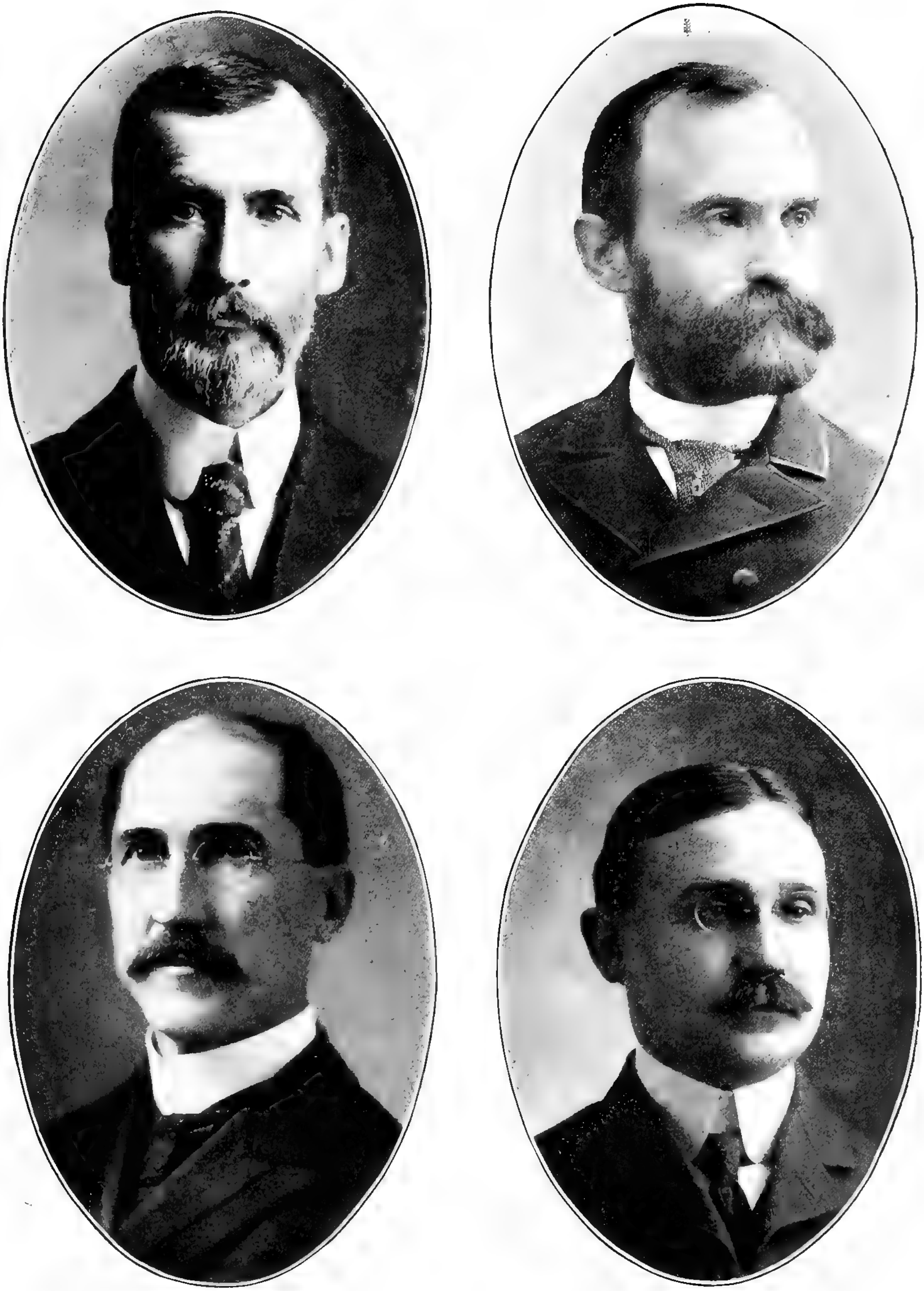
Prior to the year 1895-96 all the work in the course of study was required. In that year a very small part of the work in the senior year was made elective, and arrangements were made to offer eight elective courses. The introduction of these courses was first suggested by Professor Frederick P. Spalding, who was a member of the faculty from 1891 to 1898. In 1904 the number of such courses was increased to fourteen; at present nearly one-fourth of the senior work is elective.

The elective courses are really advanced courses dealing with subjects that were treated in his required work, for the regular work is so arranged that the graduate may enter with practically equal facility into any position that is open to young civil engineers.

At the opening of the university 39 students registered for the course in civil engineering; the number increased to 104 in 1871-72, and then steadily declined for some years owing to the general financial depression throughout the country, and the lack of adequate equipment in the college. In the summer of 1881-82 Professor Fuertes visited the schools of England, France, and Germany and purchased an extensive collection of models, photographs, and apparatus, the trustees having made a liberal appropriation for this purpose. The following year an increase in the number of students began, which has been continuous up to the present time, save between the years 1893-96, due to the prevailing financial conditions. When the college moved into its new building in 1889 there were 134 students, while in 1904 there are 361. In the fall of 1903 the number of freshmen was 123, or an increase over the preceding year of more than one-third. The present senior class is larger than the number of seniors in civil engineering in any other university or college in the country.

Almost at the beginning the policy was established not to admit special students unless they were graduates of a college. On this account many students were excluded, but it served materially to secure and maintain a high standing for the graduates of the college.

Professor Crandall assumed charge of the college upon the death of Director Fuertes. His work and influence upon the development of the College of Civil Engineering is an important factor in its growth; he has labored in a way that few men labor, that he might do his whole duty by the students who came to him for instruction, and that the college he loves might have



CIVIL ENGINEERING

Charles Lee Crandall
Henry Sylvester Jacoby

Irving Porter Church
John Thomas Parson

its standards continually raised and its influences broadened. His reward has not been in material things, nor has he in any manner sought material advancement except as it might strengthen his hands for the work of his life—the uplifting of the students with whom he is brought in contact. No man ever connected with the college has more real friends among the alumni of the college than Charles Lee Crandall. The magnitude of the correspondence which he conducts in promoting the interests of graduates is astonishing to those who have not given thought to the growth of the college. This is purely a labor of love, but in spite of the press of other duties it is never neglected. Few men have the ability to judge more accurately of a man's true worth and capabilities than he; and no man is more rigid than he in giving his best judgment frankly, without equivocation or reservation. This very fact makes his opinion widely sought and adds to the burden of his correspondence.

Of his work directly in the college, his influence has been that of a man in close touch with the practice of his profession and alive to its educational needs. In the field work of the lake survey he was for years, and is now, the moving spirit; and a very large part of the credit for the work done on these surveys is due directly to his leadership and faculty of inspiring the student to independent effort. His work in geodesy is probably in advance of similar work given in any engineering course in the country, and men have gone from his training who are leaders in the geodetic practice of the United States.

He is an acknowledged authority on railway engineering, and is frequently called as an expert witness in difficult cases. His field practice with the students is unique, involving as it does a real live problem, varied from year to year, and sufficiently comprehensive to involve a wide range of practice in matters of location and construction.

Applied Mechanics and Hydraulics

The students are fortunate who, during the past twenty-five years, have been able to take up the study of mechanics under the guidance of a teacher whose grasp of the principles and applications of this science is not only profound, but whose sympathy with the student in his early difficulties, and whose ability to point out the pitfalls in the pathway of the unwary, have endeared him to the heart of every true student of engineering since first Professor Church became connected with the university, as a teacher, in 1876.

Professor Irving Porter Church entered the university as a student in civil engineering with the class of 1873, and after graduation he spent three years in the teaching profession before returning to Cornell as assistant professor of applied mechanics in the department of civil engineering. Promoted in 1891 to an associate professorship, and in 1892 to the professorship of applied mechanics and hydraulics, the trustees have thus secured to successive classes of engineering students his continuous and devoted services for nearly thirty years.

By reason of the clearness of statement, and the logical but simple development of the principles and applications of mechanics, Professor Church has, in his *Mechanics of Engineering,* furnished the engineering student not only with one of the very best but one of the most widely used text-books in this country.

His tireless and unremitting work in the classroom, and the many and varied services Professor Church has ever been ready to render to the college and to the university, have prevented him from taking that part in engineering discussions and in making contributions to engineering literature which would bring him prominently before the public.

His influence upon the engineering world of to-day has, however, been none the less marked, as the many students who have gone forth from his lecture room will testify, and who find that an appeal to their former instructor in technical matters never fails to elicit a prompt and convincing solution of their difficulties.

Following the introduction of laboratory methods in the teaching of mechanics, upon the occupation of Lincoln Hall by the civil engineers in 1889, Professor Church introduced similar methods in connection with the course in hydraulics, the south end of the basement serving for many years as a hydraulic laboratory.

Although the equipment was modest and the space available very limited, yet the student was able to here supplement the classroom work with accurate and varied experimentation along many lines of hydraulic work.

The talents in his charge, thus carefully and effectively employed, brought to the department of hydraulics and to its head a generous reward, when the trustees in 1896 made an appropriation for the construction of the present hydraulic laboratory at Triphammer Falls.

The old laboratory had admirably served its purpose as an adjunct to the classroom instruction, but the new structure was designed for a broader field of work, and, in the words of the late Professor E. A. Fuertes, was created " to foster the progress of hydraulic science."

During the second half of the college year 1897-98 Professor Church was absent from the university on leave, and during a portion of this time he made an examination of the hydraulic equipments of several of the larger engineering institutions of this country. The actual design of the laboratory was the work of

Frank S. Washburn, C. E., '83, a former alumni trustee of the university, assisted by Elon H. Hooker, Ph. D., of '96, who was also the resident engineer during construction. The contract for the work was awarded to the late Ira A. Shaler, C. E., of the class of 1884.

The laboratory was transferred to the trustees in July, 1898, and by them entrusted to the care of Director E. A. Fuertes, of the College of Civil Engineering.

The position of active director of the laboratory was filled by the appointment of Gardner S. Williams, C. E., at that time engineer to the Water Board of Detroit, Mich., who received the title of professor of experimental hydraulics.

The lack of funds prevented the entire completion of the laboratory at this time, and, indeed, the need of an ample endowment has seriously hampered the fulfilment of the purpose of the designers; but despite these difficulties, many important studies and much valuable work of instruction have been accomplished during the past few years.

For a short time after the appointment of Professor Williams, the control of the laboratory was placed entirely in the hands of the professor of experimental hydraulics, but later was again turned over to the director of the College of Civil Engineering, and no change has since been made.

Professor Williams's connection with the laboratory ceased in the summer of 1904, when he was called to the University of Michigan as head of the department of civil engineering, and the vacancy thus created was filled for the year 1904-05 by the appointment of Dr. E. A. Schoder, as "Engineer in Charge."

Among the many important investigations carried on by Professor Williams during his connection with the laboratory may be mentioned the following:

In co-operation with the United States Board on Deep Waterways: A study of the flow over dams. For the Barge Canal Survey, at the request of the State Engineer: A study of the accuracy of rod floats and meters in determining the flow in canals, etc. For the Croton Aqueduct Commission, under the supervision of J. R. Freeman, C. E.: A study of the discharge over the old Croton dam.

Among minor studies may be mentioned: Tests to determine the degree of permeability of the materials used in the construction of the Jerome Park reservoir, New York City; A comparison of methods for measuring the head on a weir; The loss of head due to friction in pipes; The rating of current meters; The distribution of velocity in the cross-section, both in canals and in pipes; The resistance due to bends in pipes, etc.

Mention should also be made of the experiments conducted by the department of marine engineering upon various problems connected with the design of propellers, work upon which is now going on under an appropriation from the Carnegie Institute.

Besides these studies, which have afforded ample and valuable opportunities for student work, both graduate and undergraduate, regular class work is carried on in connection with the theoretical hydraulics as in the old laboratory.

That the trustees were justified in the construction of the largest hydraulic laboratory in this country, if not in the world, is proven by the results already accomplished, and with such ample facilities at her command we may feel sure that Cornell University will in the future, as she has done in the past, hold a foremost place in the teaching and investigation of hydraulic science.

The establishment of a course in mining engineering was a favorite desire of President White. Various considerations prevented the realization of his hope; among them was the peril of creating a new department when adequate provision for existing departments had not been made. There was also the possible disadvantage arising from the fact that certain other universities which had courses in mining engineering were situated in the vicinity of coal, iron, gold, silver, and copper mines, which made it possible to acquire readily the ore needed for analysis, and also afforded an opportunity to study at the same time practical mining operations. Experience, however, has shown that ore for analysis is readily transported at a limited expense. Moreover, the proximity of the coal and iron mines of Pennsylvania finally caused a decision in favor of the establishment of a new course in mining engineering. The establishment of such a course was especially easy in view of the fact that provision was already made in other courses for most of the studies embraced in the proposed course.

Professor Elmer James McCaustland, who is to give the technical instruction in mining which is not provided by the courses in civil engineering, is a graduate in civil engineering of Cornell College, Iowa, and a graduate student at Cornell University, where he received the degree of Master of Civil Engineering in 1897, where he also filled the position of instructor of civil engineering from 1897 to 1900. He has had an extended experience as an expert in the mining regions of the West, and later he filled the chair of civil engineering in the School of Mines and Metallurgy in the University of Missouri.

The great development in this country of works requiring the service of civil engineers for their design and execution has gradually led to the subdivision of this profession into railroad, bridge, hydraulic, sanitary, irrigation, and other branches of engineering, and the development of corresponding courses has accordingly been more carefully elaborated and worked out in detail than the older general courses in civil engineering or in construction. This change became possible as the number of professors and assistant professors increased.

In the department of bridge engineering the aim of the course in structural design is to illustrate the most thorough application of the principles of mechanics to the design of the simpler structures. The designs adopted are typical, and their details are proportioned according to standard specifications and made to conform to the conditions of modern practice by studying the details of carefully selected plans from the offices of bridge engineers in different parts of the country. The directions given for designing constantly emphasize the theoretical principles, and their application broadens the students' conception of the true character of these principles and their mutual relations.

Many of the most important advances in engineering construction are due to a more thorough application of the fundamental principles of mechanics to details that formerly were regarded as too unimportant to receive such attention.

A single instance may be mentioned regarding the leadership of the college in engineering education. Recognizing the importance of the rapid introduction of reinforced concrete in construction, and the promise of its wide usefulness, the design of a reinforced concrete arch was introduced so that every young graduate may with confidence deal with this class of problems which will very likely be presented at an early stage of his practical experience.

Systematic meteorological observations were begun in 1873, first as a private enterprise and afterwards by the university. Soon an effort at local weather prediction was attempted, taking the government predictions as a basis. The farmers of the county were interested, and a tall pole was erected near the site of the present library from which large signal balls were displayed.

This work was taken up formally by the College of Civil Engineering in December, 1878, and continued until late in 1889, when the local work was assumed by the State Meteorological Bureau, which was duly organized under the laws of the state of New York, Chapter 148, Laws of 1889. At this time the work which had previously been local was extended to cover the entire state. The service was a joint co-operation between the National Bureau and the State Bureau, and its object was to maintain a climate and crop service. A monthly bulletin was issued at the close of each month, showing the distribution of precipitation, temperature (maximum, minimum, ranges, mean, etc.), and other elements, and an annual summary at the close of each year. These bulletins were mainly in demand by railroads, engineers in the construction of railroad bridges, and in the study of the water problems in this and other states, in the adjustment of railroad claims for damage to freight, in the courts of law as evidence, by people seeking a change of climate for the purposes of business or health, and largely for investigation. During the planting, growing, and harvesting season weekly climate and crop bulletins were issued to the public, showing the various weather changes, and the effects on growing crops. These bulletins were furnished to daily and weekly newspapers, to commission dealers, and to all others interested in the subjects covered. The joint service continued under these conditions until May, 1899, when the state service ceased to exist owing to fail-

Frank Arthur Barton
David Fletcher Hoy

Charles Van Patten Young
Hollis Ellsworth Dann

ure of the state legislature to provide funds for that purpose, whereupon the entire work was assumed by the National Bureau under co-operation with the university, which continues at present. A full equipment of weather-bureau instruments was installed, and the station thus became a regular weather-bureau station of the first class, with instruments making a continuous record of wind direction and velocity, rainfall, sunshine, temperature, and atmospheric pressure. The issue of the daily weather-map began with the new arrangement, and all necessary work of the old régime was continued. About 134 stations, well distributed over the surface of the state, report to Ithaca, the Section Center for New York State, and during the crop season, from April to October, about 480 correspondents report weekly, these reports being the basis for the weekly crop bulletin issued to the public each Tuesday during the period mentioned.

Until 1889 the laboratory work of the students in civil engineering was mainly that in physics and chemistry, with occasional incidental work by individuals in the testing of materials and hydraulic experimentation on a small scale in the old wooden building. After Lincoln Hall became the home of the department of civil engineering, however, in the fall of 1889, regular laboratory work in civil engineering was introduced and required of all students in the department, embracing the testing of materials, including cement, iron, and steel, work in connection with geodetic instruments, and also in hydraulic work on the small scale on which the last could be undertaken in the basement of Lincoln Hall. Time was gained for some of this work by the omission of the physical laboratory work previously prescribed. Work in the new Laboratory of Sanitary Engineering was also begun.

It has always been the policy of the college to foster and develop laboratories and laboratory work. From the beginning, laboratory work of some kind has had a place in the course of instruction. The work was more or less limited, however, owing to restricted facilities, until the college was housed in Lincoln Hall. At this time the scope of the laboratory work was broadened, and all students were required to pursue a course which was designed to supplement and illustrate the classroom and text-book instruction in the mechanics of engineering.

The detail of the general laboratory work has been modified from time to time as conditions changed, but in no case has any wide departure been made from the original idea, which was to provide for the experimental study of subjects connected with the theoretical instruction of the lecture room, and as a preparation for work in special laboratories.

These special laboratories are provided with facilities for advanced work and are open to senior and graduate students. The hydraulic laboratory is fully described elsewhere. The testing laboratory for materials of construction is fully equipped for the establishment of standard tests, and for tests on full-sized members, joints, and structures. The primary purpose of these laboratories is the instruction of the student, but some special investigations have been carried on, resulting in much information of value to the engineering profession. Mention might be made of tests of the bearing strength of steel rollers, the strength and elasticity of brick piers, the elasticity of concrete under compression, and the elastic limit of riveted joints.

This last-mentioned series of tests was undertaken at the request of a committee of the American Railway Engineering and Maintenance of Way Association, and furnishes the most extended series of tests on riveted joints ever made.

The geodetic, metric, and photographic laboratories are fully equipped for their respective purposes, and every effort is made to place the student under conditions favorable to the development of independent investigation.

Since 1890 the attendance of graduate students has fostered the spirit of original investigation, the influence of which is felt by undergraduates as well as instructors. On account of the great demand for the graduates in active practice, the number of graduate students is relatively small. While some of these students enter professional life afterwards, a considerable number devote themselves to teaching, and thereby the influence of Cornell ideals and methods is disseminated among other engineering colleges.

The twenty-nine graduates who are engaged in teaching civil engineering are distributed in sixteen colleges of engineering, and five of the eighteen full professors occupy the rank of dean in their respective colleges. Professors Crandall and Church have devoted their lives to Cornell University, the former now being in charge of the College of Civil Engineering; F. E. Turneaure is dean of the College of Engineering in the University of Wisconsin; Anson Marston holds the same position in the Iowa State College at Ames; Henry T. Eddy is the professor of electrical engineering in the University of Minnesota; Charles D. Marx and Charles B. Wing are professors of civil engineering in Leland Stanford University; W. K. Hatt is the professor of applied mechanics in Purdue University; H. K. Vedder is professor of mathematics and civil engineering in the Michigan Agricultural College; S. N. Williams is the professor of civil engineering in Cornell College, Iowa; J. J. Knoch holds the same position in the University of Arkansas; C. W. L. Filkins is the professor of civil engineering in the Colorado School of Mines; A. H. Fuller and C. C. More are respectively dean and professor of civil engineering in the University of Washington, and Earl B. Lovell is professor of railroad engineering and hydraulics in Columbia University. Mr. Frank Parsons, one of the early graduates, is a lecturer in the Boston University Law School and a writer of legal textbooks.

A census of the 633 graduates of the college revised to May, 1904, gives the following results: 5 are presidents of railroads and industrial corporations, 172 are chief engineers, superintendents, or managers of railroads, bridge works, municipal or manufacturing works, contractors, or engineers in private practice; 82 are assistant chiefs, resident or division engineers on such works, or treasurers of industrial and other corporations; 166 are assistant engineers on such works, or engaged in the United States Coast and Geodetic Survey, the United States Geological Survey, or other national bureaus; 37 pursue the allied professions of mining, mechanical, and electrical engineering, of architecture, law, and medicine, or occupy important positions with foreign governments; 31 are draughtsmen in the engineering departments of railroads, of bridge, municipal, or manufacturing works, rodmen, or recorders; 43 are engaged as manufacturers, merchants, bankers, farmers, etc., while 36 are educators. Of the last class, 18 are full professors, 6 associate and assistant professors, and 5 instructors in engineering colleges. The returns from 10 are incomplete, while 51 have died.

This analysis shows that an unusually large percentage of the graduates occupy positions of responsibility and professional influence, the recent graduates even having but a small representation in the rank of draughtsmen. It affords an excellent demonstration of the adaptation of the instruction of the college to the professional needs of the country, while the success of those in active practice has stimulated a demand for the young graduates far in excess of the supply.

The College of Civil Engineering does not simply provide for the technical instruction of its own students, but gives important courses of instruction to the students of other colleges. Mechanics and descriptive geometry are taught to all students in Sibley College and in the College of Architecture, while the latter also receive instruction in structural details and the theory of the arch. In 1891-92 the number of students from other colleges in these classes averaged 269.

The college faculty now consists of the following:

Charles Lee Crandall, C. E., M. C. E., professor in charge, and professor of railway engineering and geodesy.

Irving Porter Church, C. E., M. C. E., professor of applied mechanics and hydraulics, in charge of the college library.

Henry Sylvester Jacoby, C. E., professor of bridge engineering.

Henry Neely Ogden, C. E., assistant professor of sanitary engineering, in charge of descriptive geometry, and secretary of the college faculty.

William Elton Mott, S. B., assistant professor of hydraulic engineering and registrar of the college.

Elmer James McCaustland, C. E., M. C. E., assistant professor of mining engineering and surveying, in charge of the Laboratory for Testing Materials.

John Thomas Parson, assistant professor of drawing.

Oscar Augustus Johannsen, B. S., A. M., Ph. D., assistant professor of structural engineering.

There are also eleven names upon the list of instructors.

Prominent practicing engineers are engaged from time to time to deliver special lectures upon engineering topics of especial importance, and Frank W. Skinner, C. E., associate editor of the *Engineering Record,* is a lecturer in field engineering. He has made a special study for more than twenty years of the methods and appliances used in the field in erecting bridges, buildings, and other large structures, driving tunnels, sinking shafts, building subways, etc. The lectures upon this subject are illustrated by hundreds of lantern slides prepared for the course and selected from the vast collection of photographs in his possession. This course, a part of which was first given in 1899, is treated as a part of the required work of all undergraduates. Occasional lectures are given by prominent engineers in practice, the object of which is more to stimulate enthusiasm, quicken interest, and to bring the student in contact with those who have achieved success in the professions than to give information.

The entrance requirements are nearly a year above the average college of civil engineering, and its graduates stand in the front rank of those from the best institutions of the country. The number of students has increased to 383, and the brownstone building provided in 1889 for an attendance of 134 has become so completely outgrown that an enlargement of quarters is imperative.

CHAPTER VI

THE NEW YORK STATE COLLEGE OF VETERINARY SCIENCE

CORNELL UNIVERSITY was the fruit of the National Land Grant to the state of New York, and, like all institutions availing of the same act, was imperatively required to teach three definite subjects—agriculture, mechanic arts, and military tactics. At least two among its first trustees, its founder and Mr. William Kelly of Rhinebeck, were engaged in agriculture, and each was owner of fine herds and flocks. Both highly appreciated the value of improved live stock as compared with common, and realized how essential live stock was in preserving and enhancing the fertility of the soil, and both had followed the record of the then recent desolation of Great Britain by rinderpest, and were more or less alive to the dangers that threatened the live stock in the northern states from the great influx of infected southern cattle after the conclusion of the war. The preservation of the health of the live stock, therefore, could not be overlooked when the scope of the proposed university was discussed, and the recognized need of a veterinary department was voiced by Ezra Cornell when he enjoined President White to secure in Europe a veterinary professor for the infant institution.

During his European trip, in the early months of 1868, Mr. White secured the Auzoux models of domestic animals and their diseases, a selection of the best literature of the Old World bearing on the subject, and a collection of veterinary instruments. For the veterinary chair he named James Law, F. R. C. V. S., who had been educated in Great Britain and on the Continent; had taught anatomy and materia medica in the new Veterinary College at Edinburgh and in the Albert Veterinary College, London; had also had extensive experience in the practice of veterinary medicine in Great Britain and Ireland; and, although young, was already widely known as the author of a work on the *Anatomy of the Domestic Animals.*

When the university opened, in 1868, a room was allotted to the veterinary department on the second floor in the one completed building now known as Morrill Hall, while for museum and laboratory uses it had a room in the basement of the same edifice. The beginning was modest, indeed, but it shared with others in the day of small things, and hope was nurtured by the expressed purpose of President White to have it developed into a veterinary college.

For the first year the work of the veterinary professor was mainly confined to the delivery of a course of lectures on anatomy, physiology, and hygiene, dietetics, breeding, veterinary medicine, and surgery. Attention was also given to such clinical instruction as was afforded by the presentation of animals for treatment. In the second academic year (1869-70), at the urgent request of several students, special classes in veterinary anatomy, physiology, and hygiene were begun, supplemented later by others in the science of pathology, the practice of medicine and surgery, and the various cognate subjects that go to make up a professional education.

Of the students that pursued these special courses, a number entered veterinary schools elsewhere, where they could secure a degree at an earlier date; others entered medical schools, and some devoted themselves to other departments of science. Representatives of these special classes are found to-day teaching in veterinary, medical, and other colleges. Four only secured the Cornell degree in veterinary medicine, and of these, three were employed in the Bureau of Animal Industry at Washington; one has served for a period of twenty years as chief, and the other two as valued co-workers in the field of veterinary sanitary science. The work of these students, as published in the yearly reports of the bureau, reflect the highest credit on their *alma mater* and on their own scientific devotion and acumen. Dr. Salmon, chief of the bureau, has also served as alumni trustee of the university.

As time passed without any material addition to the equipment, it became only too plain that to maintain the semblance of a veterinary school with existing means, and to grant degrees, was unfair to all concerned,—to the institution, teacher, and students,—and, in the absence of any immediate prospect of an adequate equipment, it was judged better to refuse all students who came with the object of obtaining a veterinary degree. For a number of years, therefore, the veterinary department was remanded to the position which it occupied in the first year of the university—as a simple chair in the College of Agriculture.

In connection with the failure of the department to develop into a veterinary college, it should be stated that the executive committee twice appropriated the sum of ten thousand dollars to construct a veterinary building, but as no suitable site could be agreed upon, the appropriation lapsed, and veterinary instruction was still given in connection with a small room for a museum and the use of a lecture room devoted in the main to another science.

But if, in the first twenty-eight years of the institution, it failed to furnish a veterinary college, the chair was not without influence upon the state and nation apart from the instruction furnished to students. In

1869 the veterinary professor was appointed consulting veterinarian to the New York State Agricultural Society, and, besides attendance at the State fairs and examination of animals on exhibition, he contributed at intervals numerous papers to the transactions of the society, some of which contributions have been translated and republished in Europe. In 1876 he served as veterinarian in charge of the sanitation of the animals on exhibition in the Centennial Exposition. In 1878 he was appointed by Governor Robinson as veterinary counsel in dealing with the lung plague of cattle in the state of New York. In 1881 he became chairman of the United States Treasury Cattle Commission, and prepared three yearly reports on the restriction and suppression of epizoötics, together with a number of lesser reports on particular outbreaks of contagious and other animal diseases. In 1883 he represented the United States Department of Agriculture at the International Veterinary Congress at Brussels, Belgium, and embodied in a paper the deliberations and resolutions of that body for the report of the Department of Agriculture of that year. To this was appended a report on the veterinary colleges of Europe. In 1885 he was appointed by the governor as State Veterinarian, and served in that capacity until called in 1887 by the United States Department of Agriculture to direct the work for the extinction of the lung plague in cattle in Illinois. Having accomplished this object, and having been granted a year's leave of absence by the university, he went successively to Baltimore, Philadelphia, and New York to assist in the organization of the work for the extinction of this plague in Maryland, Pennsylvania, New Jersey, and New York. In this latter state he remained in charge of the work, in the double capacity of agent of the governor and veterinary superintendent for the United States Depart-

JAMES LAW
(Director of State Veterinary College)

ment of Agriculture, until the fall of 1888, when he resigned to resume his university duties. The sanitary work was, however, continued on the same lines, and in three years the continent was rid of the lung plague in cattle, with which it had harbored for forty years, at a loss in its exports alone of two million dollars per annum. In 1894 he was appointed on the state commission on tuberculosis in cattle, and wrote the report presented to the governor and legislature.

Beside these official services the incumbent of the veterinary chair contributed largely to educate the public on veterinary medicine and surgery by his publications. His *Farmer's Veterinary Adviser* has been used as a text-book in many agricultural colleges and has reached its thirteenth edition, and been republished in Canada and in England.

This work has not been without its influence in preparing the public mind for the appreciation and fostering of veterinary science, and especially of veterinary sanitary science. The extinction of one animal plague has demonstrated the possibility and economy of stamping out other animal plagues dependent like that on a pure parasitic infection. The work of Pasteur and his followers in securing germs of diminished potency, capable of producing non-fatal forms of a given plague, and giving immunity from the more destructive forms, has shown how science may diminish the mortality of diseases which still continue to exist. The still more important fact, to which the Cornell veterinary professor contributed by his experiments with swine-plague, anthrax, and rabies, that the sterilized chemical poisons, produced by the microbes of a self-limiting disease, can, in suitable cases, be used on the susceptible animal to produce immunity from that disease, opens a way to do away with the mortality of a disease, though the germs still exist in the locality. The use of antitoxins produced in the system of an immunized animal, of protective serums, and of protective extracts from different organs to cure an infected subject or immunize a susceptible one, though less familiar to the general public, has now become essential to the advanced members of the medical fraternity. The use of the chemical products of the germs, as a means of diagnosis of occult forms of disease like tuberculosis and glanders, opened a way for the discovery and extinction of cases of disease which had hitherto escaped the most skilful inspection. Further, the investigation of the composition of such disease-poisons and of their appropriate antidotes became the natural work of such institutions. The more this field was studied the wider its possibilities appeared, and the demand for its investigation became imperative. By 1894 the all but universal interest in the tuberculosis of cattle and its conveyance to man through meat and milk, created a demand for veterinary supervision of our herds, and for veterinarians sufficiently well educated in bacteriology, epidemiology, and sanitation to be entrusted with the extinction of the disease in animals.

In 1894 Governor Flower called the attention of the legislature to the wisdom of concentrating the various state agencies for the promotion of agriculture, and especially to the importance of establishing under the auspices of the state a college of veterinary science.

Governor Flower's Message to the Legislature

" I desire to call the attention of the legislature to the advantages offered by the State Land Grant College, Cornell University, for carrying on the scientific work of agricultural promotion, which is now divided among several agencies and which should be concentrated under the direction of such a bureau as I have recommended. I think it will be conceded that more effective scientific work of this nature can be done in connection with a great educational institution, and the grouping of these now scattered departments of agricultural effort at one place and under one general supervision will also be a considerable saving of expense in maintenance. Cornell University furnishes an excellent nucleus for carrying on this state work, and its facilities and instructors might be utilized by the state with great advantage to agricultural interests. The State Meteorological Bureau is already located there. There is also an Agricultural Experiment Station already established and doing effective work. Moreover, the institution has established practical courses of instruction in agriculture, botany, horticulture, dairy husbandry, animal industry, poultry keeping, and veterinary science. It offers free of charge and without examination, to all persons who are sixteen years of age, competent instruction in these subjects for one or more terms.

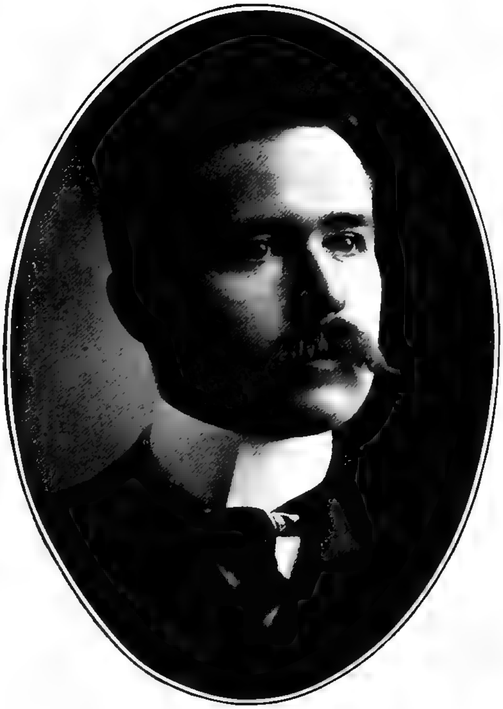
" It is entirely, however, with a view to state advantage that I would urge the concentration at Cornell University of the various agencies for promoting scientific agriculture. To carry out this suggestion would not only enable the state to do more effective work immediately and at less expense, but would permit the state from time to time to extend its field of usefulness in this direction without the creation of new boards and new offices. The proper diffusion of knowledge with reference to the preservation of our forests is of vital interest to the future welfare of the state, and could be obtained through such an agency. The same is true of the spread of veterinary science. Public attention has only lately been called to the vast importance of this subject—not merely as it affects the value of our live stock, but because of its intimate relation to the question of public health. Modern science has demonstrated that a large proportion of human disease is directly traceable to diseases of animals, conveyed through milk, meats, eggs, and other animal food. Thousands of milch cows in this state suffering from tuberculosis are furnishing milk to families, and thereby endangering human lives by the transmission of this dread disease. A proper regard for the health of the community will eventually demand scientific protection against dangers of this kind. Our state has already taken the initiative in this direction. But the chief obstacle to a correction of this evil is the lack of experienced and capable veterinarians.

" Our state is too thoroughly committed to the encouragement of agriculture to abandon it. State energy and public money, however, should not be frittered away by misappropriation and misdirection. The time is ripe for the adoption of some comprehensive, systematic, and intelligent policy which shall assure the best results at the least expenditure. Whether the suggestions I have outlined are the best for accomplishing these results I leave to your judgment."

The legislature in that year voted an initial appropriation of $50,000 toward the erection and equipment of a veterinary college in connection with the university. In the following year an appropriation of $100,000 was made for this purpose, thus making the entire sum available $150,000.

The plans for the new buildings of the college were prepared by Professor Osborne.

In all, seven buildings were provided: first, the main building, containing the business office of the college, its heating and ventilating plants, museum, reading-room, laboratories and lecture room for physiology



NEW YORK STATE VETERINARY COLLEGE

Walter Long Williams
Grant Sherman Hopkins

Veranus Alva Moore
Pierre Augustine Fish

and pharmacology, laboratories for microscopy, histology, embryology, pathology, and bacteriology, culture rooms for the latter, anatomical laboratory, large amphitheater, etc.; second, the general ward for non-contagious medical and surgical cases; third, the contagious ward with detached stalls and vitrified lining; fourth, the operating theater; fifth, the mortuary building; sixth, a shed for detention of cases; and seventh, a cottage for the stud groom. To these have been since added a forge, a room and yard for small experimental animals, and a kennel for sick dogs.

The New York State Veterinary College was erected in the years 1895-96, and was opened for instruction at the beginning of the academic year 1896.

In 1896 provision was made for the support of the college by an item for that purpose of twenty-five thousand dollars in the appropriation bill which provides for the maintenance of the state government and the state institutions. These successive measures were all introduced and conducted to a successful issue by Senator E. C. Stewart, whose name is thus associated with the establishment of the State Veterinary College at Cornell University.

The faculty appointed by the board of trustees to have charge of the new state college consisted of the following members:

Dr. James Law was made director of the State Veterinary College, and professor of veterinary medicine, principles and practice, zymotic diseases, and state medicine.

Dr. Veranus Alva Moore, B. S., M. D., was appointed professor of veterinary and comparative pathology and bacteriology. He had been chief of the pathological division of the United States Bureau of Animal Industry, Washington, D. C., professor of pathology in the National Veterinary College, and of histology in the medical department of the Columbian University, Washington, D. C.

Mr. Simon Henry Gage, B. S., was appointed professor of microscopical technology, histology, and embryology. He was professor of anatomy, histology, and embryology in Cornell University, and had been chairman of the section of biology of the American Association for the Advancement of Science, and president of the American Microscopical Society.

Dr. Walter Long Williams, D. V. S., was appointed professor of veterinary surgery, obstetrics, zoötechny, and jurisprudence. He had been professor of veterinary science and physiology in the Montana College of Agriculture and Mechanic Arts, and veterinarian to the Montana Agricultural Experiment Station, professor of veterinary science in Purdue University, and veterinarian to the Indiana Agricultural Experiment Station.

Dr. Pierre Augustine Fish, B. S., D. Sc., D. V. S., was appointed assistant professor of veterinary and comparative physiology, materia medica, and pharmacy. He had been assistant in the pathological division of the United States Bureau of Animal Industry, Washington, D. C., instructor in physiology and vertebrate zoölogy in Cornell University, and in zoölogy in the Marine Biological Laboratory at Wood's Holl.

Dr. Grant Sherman Hopkins, B. S., D. Sc., was appointed assistant professor of veterinary anatomy and anatomical methods. He was formerly instructor in comparative anatomy and embryology in Cornell University.

A course of study extending over three years, of nine months each and leading to the degree of D. V. M., was laid out.

By its charter the college is dedicated to investigation as well as to instruction. It is an experiment station for discovering as well as a school of instruction for communicating knowledge relating to the welfare of animals. The primary object of the college is to serve the state by furnishing scientific aid and protection to the farmers and stock owners and to the public, to whom disease may be communicated through animals. The staff of the Veterinary College is ready to make visits to any part of the state for the purpose of aiding in the suppression of epidemics or the extirpation of disease. The direction of any such state administration remains in the hands of the commissioner of agriculture, and without his order no official work can be undertaken, so that the availability of the state college, in the line of sanitary medicine, remains to a large extent inoperative.

Having an independent financial basis, the Veterinary College has been strictly separated from all other departments of the university, and there is no interchange of classes excepting that all students of the Veterinary College receive instruction in chemistry, animal husbandry, microscopy, histology, and embryology from the university, while certain university students may take work in Professor Moore's department and agricultural students may study with Drs. Law, Fish, or Williams.

The year following the establishment of the state college, the number of students registered in the regular courses was eleven. Seventy-one students came from other courses in the university and fifty-three attended lectures given in the short winter course. Three veterinary students were candidates for graduation. The increase in the number of students has been rapid and progressive from year to year, showing that an interest in veterinary science is being developed throughout the country. In 1904, 104 veterinary students were registered. In 1903 they had numbered 89, beside the 115 agricultural students who took veterinary studies.

The Roswell P. Flower Library was purchased during the year 1897 from a gift of $5,000 received from ex-Governor Flower, coming as a supplement to a collection of some five thousand volumes on veterinary and kindred subjects, formerly in the university library. This gift placed the New York State Veterinary College foremost in library resources. Mrs. Flower completed this gift by giving to the college in 1900 an endowment of $10,000, the interest of which is to be used annually for the purchase and binding of books. This gift has made adequate provision for the permanent support and increase of the Roswell P. Flower Library.

November 13, 1900, the main building of the college was partially destroyed by fire, the laboratories on the upper floor and their contents were totally destroyed, and considerable damage done to other departments through water, smoke, and the hurried removal of valuable specimens and apparatus. The reconstruction of the building was immediately begun, and prompt measures were taken to prevent any serious interference in the work of the college. The final result was that the burnt-out laboratories were restored, with considerable improvements, and, as Professor Gage was at the same time transferred to the newly finished medical college, the laboratories of pathology and bacteriology were exactly doubled in capacity and their facilities correspondingly improved.

Among the most important works published by the members of the faculty of the veterinary college have been: *General and Descriptive Anatomy of Domestic Animals,* and a monumental work, *Text-Book of Veterinary Medicine,* in five volumes, by Dr. Law; *Labora-*

tory Directions for Beginners in Bacteriology (1900), and *The Pathology of and Differential Diagnosis of Infectious Diseases in Animals* (1902), by Dr. Moore; *The Microscope and Microscopic Methods,* and *Anatomical Technology,* in company with Dr. Wilder, by Professor Gage; *Comparative Physiology, a Guide to Laboratory Exercises,* and *Exercises in Materia Medica and Pharmacy,* by Professor Fish; and *Surgical and Obstetrical Operations,* by Dr. Williams.

CHAPTER VII

THE COLLEGE OF ARCHITECTURE

AMONG the professorships proposed by Mr. White in the organization of the university was a professorship of architecture. Attention had already been called to the great need in this country of scientific instruction in this important branch. Professor William B. Rogers, to whom, we may perhaps say, the Institute of Technology in Boston primarily owes its existence, in an address on the " Objects and Plan of an Institute of Technology Proposed to be Established in Boston," published in 1860, had presented an eloquent plea for the organization of a Society of Arts and an Industrial Museum, and also for a School of Industrial Science and Art. He embodied in the plan of the Massachusetts Institute of Technology a course in architecture. Seldom have the beginnings of an institution been guided by a higher scientific wisdom and experience than in this case. Its foundation enlisted many of the most intelligent and progressive scholars in Boston, and all the discussions connected with the establishment of this school show an admirable mastery of the history of industrial education abroad, as well as a clear grasp of the demands of such an institution in America. This department of instruction went into operation in the institute in 1865. President Barnard, that sagacious educator and noble man, whose services as an investigator rank with his great merit in advancing the interests of Columbia College, of which he had become president two years before, said in his annual report presented June 4, 1866: " There is no country in the world in which building in a style of costly magnificence is more constantly going on than this; and yet in the whole country there does not exist a school of scientific architecture." President White, in his lectures upon the history of culture, had naturally become interested in the fine arts, as illustrating intellectual development and typifying national character. He admired the English colleges with their picturesque quadrangles and cloister-like appearance, their halls and chapels, as miracles in the history of English art; and it was with something of the feeling derived from the contemplation of these buildings, having their origin in the ecclesiastical foundations of English culture that he sought to transplant their form to this country, to a new atmosphere, but with a suggestion of the external glory and traditions of their home. This accounts for the attempted arrangement of the university buildings in the form of quadrangles. There seems to have been a suggestion at first that the department of architecture should be linked with that of civil engineering, for we find it so grouped in the original announcements of the courses of study.

In his semi-annual report to the trustees of the university in June, 1871, Mr. White recommended the establishment of a department of architecture. In justification of his recommendation he pointed to the urgent need of such an institution, as evidenced by the wretched architecture almost universal in our towns and villages, and by the fact that only one institution in the country—the Massachusetts Institute of Technology—was offering to the student instruction in this art. The need had, moreover, made itself felt in Cornell. Several applications for work of this kind had been made, and one student, registered in civil engineering, was really engaged in the study of architecture, relying for purely architectural training mainly upon the library.

Conditions at Cornell were favorable to the execution of President White's plans, his own efforts having contributed largely toward making them so. He had just placed at the disposal of the university the largest and most complete architectural library in the country, thus making unnecessary any great pecuniary outlay for the equipment of the new school. This valuable collection was the result of fifteen years' work on the part of the donor, who had given unstintingly of his time, labor, and money, both in this country and abroad, toward its enlargement and perfection. In addition to the advantage thus gained in the way of equipment, it was found possible, by allying the new school closely with that of civil engineering, to organize it without greatly increasing the number of instructors. A professorship of architecture was accordingly established, and on September 18, 1871, the Rev. Charles Babcock, A. M., was elected professor of architecture, in whose charge the department remained until after it was reorganized and raised to the dignity of a college a quarter of a century later. Professor Babcock was a graduate of Union College, and had been associated with that brilliant architect, Richard Upjohn, in architectural work in New York. To a mind loving art in every form he added practical skill as a designer and draughtsman. Ecclesiastical architecture he studied with especial fondness. Upon entering on his duties, there was little equipment available for specific instruction in his department. Models, plans, and designs, which are indispensable for training in drawing, and as an illustration of styles and historical periods in art, were lacking. One valuable feature, however, for his work was available in a collection of splendid works upon the history of archi-

ARCHITECTURE

Charles Babcock

Clarence Augustine Martin

Maurice Jacques Prévot

tecture, which had constituted a part of President White's private library and which he offered to present to the university in consideration of the acquisition of a mathematical library. These were placed at the disposal of the department of architecture. Technical instruction in physics, in chemistry, in mechanics, and mathematics, and, to a limited extent, in drawing, was supplied by associated departments of instruction; but the entire work of teaching architecture devolved at the beginning upon one professor. Not only was it necessary for him to give courses of lectures upon the history of classical, Byzantine, Romanesque, Gothic, Renaissance, and later architecture, and the history of its development in various countries, but to discuss the question of the materials of construction, and the designing of public and private buildings, and to give instruction in drawing in all the forms essential to the architect. Many of the models used for illustration were made with his own hands. No department whose full equipment demands large appropriations for its proper support has so grown, with limited means, as the department of architecture. It now ranks as one of the three great technical schools of the university. It was not for several years that the department was enlarged by the addition of an instructor in architectural drawing, when Frank Ayres Wright was appointed (1876-79). The first growth of the school was encouraging. Two years after its foundation the attendance reached 21 students, the following year 30, and a year later 32. During the five years following the number of students decreased until, in the year 1881, there were only 8 students pursuing the subject. After this time there was a gradual increase until, in 1893, the attendance reached the unusual number of 97, the maximum number which has been registered in this college. A decline followed, coincident with the depression in business following the crisis of 1893. The attendance has been quite uniform in the last eight years, averaging slightly above 50 students.

During the first seven years of its existence the College, or, as it was then called, the School, of Architecture, owed its character solely to the influence of Professor Babcock, and for purely architectural training the students were dependent upon him alone. In 1881 C. Francis Osborne, whom many Cornell alumni remember gratefully, was appointed to this position. The following year he was made assistant professor, and ten years later was appointed to an associate professorship. These two men were the guiding spirits of the institution up to its reorganization in 1896, and it was the progress made during their administration that rendered possible the reorganization with the resulting changes and improvements.

The first accommodations for the architectural department were found in a single room on the second floor of the west division of Sibley College. Later it occupied two rooms in McGraw Hall; it was then transferred to Morrill Hall, north end, where the second and third floors of the north hall were placed at its disposal. It was finally removed to Lincoln Hall, to accommodations which seemed ample when the building was erected, but the great increase in numbers soon made it necessary for instruction to be given to over one hundred students in rooms originally planned for fifty.

Like every living thing the present College of Architecture is the result of an evolutionary process. When the school was opened, its entrance requirements, like those of the university in general, and of other universities at that time, were considerably lower than at present. Little by little they have been raised, until recent changes have brought them to a point two years in advance of their earlier position. In the seventies the juniors were doing practically the same work that is now done by the freshmen. It is obvious that under such changing conditions the aims and character of the instruction must change. That they have done so is shown by the changes in the curriculum. During the early years of its existence the aim of the school was such as the conditions made necessary—not so much the cultivation of the purely æsthetic element in students as the impartation of that knowledge essential to success without which a true appreciation of art is impossible. Gradually, as the secondary schools were able to assume more and more of the preliminary instruction upon which advanced study must rest, the college found it possible to emphasize more and more the artistic and professional elements in architecture, until that has become an essential feature of the course.

At the opening of the course in architecture, the requirements for admission corresponded to those in the other technical courses and those in the general course in science. These consisted at that time of geography, English grammar, including orthography and syntax, arithmetic, algebra to quadratic equations, and plane geometry. These initial requirements were gradually raised. In 1877 physical geography and physiology were added, and an opportunity was made to require solid geometry and trigonometry, including logarithms, but this increase in mathematics apparently did not go into effect, for the requirements in all the technical courses remained unchanged until 1887, when solid geometry was added to these courses, and, in the following year, conic sections. In 1891 elementary French or German was required; in 1893 advanced algebra and plane and spherical trigonometry, and in 1898 advanced French or German. These requirements involve at least two years of additional study as preliminary to entering upon this course, which is now distinctly professional. While the immediate result of this may have been to reduce slightly the number of students, it produced so noticeable an improvement in the attainments of those admitted that a corresponding advance in the curriculum became possible.

In 1895 it was decided to reorganize the school and to raise it to the dignity of a college, Professor Babcock becoming the director of the new College of Architecture. The following year, however, feeling the need of the rest to which his long service had so justly entitled him, he resigned his position, and was made professor emeritus by the Board of Trustees as a mark of the esteem in which they held him.

The corps of instruction was enlarged in 1894 by the appointment of Mr. Clarence Augustine Martin as instructor in architecture, who was promoted to the rank of assistant professor in the following year. Professor Martin received his preparatory training in Oberlin, and then entered Cornell for the special two years' course in architecture. Upon the completion of this course he spent several years of active experience as draughtsman and superintendent of construction in the offices of eminent architects. Professor Martin has given instruction in the planning of domestic buildings, masonry construction, steel construction, fireproofing, and has conducted a seminary for the reading and discussion of reviews in technical journals. He is the author of a standard work upon *Details of Building Construction* (1899).

In March, 1896, Professor Babcock resigned his office as director of the College of Architecture. The Board of Trustees, desiring to emphasize the high esteem with which they had always regarded Professor Babcock, voted to make special arrangements to permit him to retain a lifelong tenure of his residence on the campus, and elected him professor of architecture emeritus. In 1903 he was appointed lecturer in architecture and delivered a valuable course of lectures on Romanesque and Gothic vaulting, thus enriching the work of the college with the treasures of his long and devoted study of his favorite pursuit.

In the rearrangement of the work of the college Alexander Buel Trowbridge was elected to the position of professor of architecture in charge of the college. Mr. Trowbridge was born at Detroit, Mich., in 1868. He graduated at Cornell in 1890 with the degree of Bachelor of Science in Architecture, and subsequently continued his studies in Boston. After a stay of three years in Boston he went to Paris. There he passed the examinations for admission to the Ecole des Beaux Arts, studying in the atelier of Marcel Lambert, one of the government architects of France. After two years in Paris, Mr. Trowbridge returned to this country and began the practice of architecture in his native city.

Mr. John Vredenburgh Van Pelt was made assistant professor of planning and design. Mr. Van Pelt was born in New Orleans in 1874. At the age of fourteen he went to France, where he began the regular study of architecture in the Ecole des Arts Décoratifs. He entered the studio of Messrs. Douillard et Thierry, and a few months later was admitted to the Ecole des Beaux Arts, in which he was admitted to the first class in 1892. The *projet* presented at this time was exhibited at the Columbian Exposition. In 1895 Mr. Van Pelt secured his diploma, with the degree of *Architecte diplomé par le Gouvernement* (A. D. G.). He was the first American to earn this degree, although he did not receive it until five months later, when two other Americans were ready and received the degree with him. Until called to Cornell he practiced his profession and continued his studies in the Atelier Deglane, Paris. Professor Van Pelt is the author of an interesting volume entitled *A Discussion of Composition as Applied to Art* (1892).

Professor Van Pelt's courses were mainly in design, composition, and in perspective for painters.

The policy of the newly appointed faculty presented some radical changes from the methods used in the past; the work in design under the charge of Assistant Professor Van Pelt was developed and extended to require twice as much time to be given to that subject as had been given previously. A department of freehand drawing was established, directed by Instructor, later Assistant Professor (1898), Brauner, and the students were encouraged to study their work in drawing from the museum of casts. Intercollegiate competitions were entered into, and exhibitions of the work done in the college were given both here and in New York, Philadelphia, Chicago, and St. Louis.

Upon the resignation of Assistant Professor Van Pelt (1890) Mr. Arthur Cleveland Nash, a graduate of Harvard and of the Ecole des Beaux Arts, was appointed his successor (1890-92). Albert C. Phelps, of the class of 1894 of Illinois University, who had studied in the Polytechnicum, Munich (1897-98), where he had devoted special attention to the history of architecture, was appointed instructor in the history of architecture (1899), and assistant professor (1903). His courses are mainly in the history of architecture and of ornament.

The tendency to restrict the course in architecture to the specific subjects required in the architect's profession has led to the establishment, since 1903, of parallel courses for the bachelor's degree, in one of which the more advanced mathematics, analytical geometry, and calculus are retained, and in the other their place is assigned to more extended work in architectural design.

Professor Trowbridge resigned after five years of useful labor, and Professor Van Pelt was recalled to be his successor and placed in charge of the college. His active participation in the work of the college after his return only extended through the first half-year, when he received leave of absence to prosecute some special studies in Paris, after which he resigned to enter upon the practice of his profession in New York.

Upon the resignation of Professor Van Pelt, Assistant Professor Martin was promoted to the rank of professor and placed in charge of the college, and the work in design which had been entrusted to Professor Van Pelt was assumed by M. Maurice Prévot, who was elected to the Professorship of Design, August 9, 1904. Professor Prévot had had a brilliant career in the Ecole des Beaux Arts. Here he won the first prize in the Concourts Chenovard, the most valuable prize offered by the school. He also received several medals in design, among others the Chaudesaigne, besides winning honorable mention in the Salon. In the famous contest for the Grand Prix de Rome, the highest honor in art, he was second only to the successful candidate, his work and that of the winner standing apart from that of all the remaining competitors in point of excellence.

Professor Carpenter, of Sibley College, gives a course of lectures annually before the college upon heating and ventilation, and Assistant Professor Ries, of the geological department, lectures on clay products and building-stones, while Instructor Gutsell gives instruction in modeling.

In 1897 a traveling fellowship of the value of two thousand dollars was established, to be conferred upon the winner in an architectural competition, for the purpose of promoting a spirit of enthusiasm and emulation which is necessary to produce the best results in a profession so nearly akin to the fine arts. This is awarded in alternate years. The Traveling Fellowship in Architecture has been held by William Herbert Dole (1898-99), Richard Andrews Tissington (1900-01), Robert Irving Dodge (1902-03), and Julius André Smith (1904-05). The college has also a Resident Fellowship which is open to all graduates of schools of architecture throughout the world.

In order that the material equipment of the college might meet the demands made by the development of the new departments, an appropriation was voted by the Executive Committee for the purchase, in Paris, of a collection of drawings in architectural design. Private gifts have also been added to the collection of artistic possessions owned by the college. Among these may be mentioned a set of specimen pieces of pottery given by William Hagerman Graves, Cornell '90, treasurer of the Grueby Faience Company of Boston, also two memorial gifts presented to commemorate the memory of two former students, Charles Goodwin Sands, and of Clifton Beckwith Brown, who fell in the battle of San Juan Hill.

In order to broaden the interests of students in architecture and bring them in closer relation with the sister arts of painting and sculpture, Professor Van Pelt organized a two-year course in painting, the instruction in which devolved upon Mr. Brauner. This course, however, was not continued after 1905.

The College of Architecture is the official head of the Central New York Chapter of the American Institute of Architects. Professors Martin and Phelps are associate members of the American Institute of Architects.

William Dexter Wilson

(Late Prof. of Intellectual and Moral Philosophy)

Raymond Allen Pearson

(Prof. of Dairy Industry)

Henry Rubens Ickelheimer

(Trustee)

Oscar Augustus Johannsen

(Asst. Prof. of Structural Engineering)

Under the reorganized and enlarged faculty the work has been pushed rapidly forward along many lines, and the enthusiasm with which the students have met the new and by no means light requirements laid upon them has been extremely gratifying. Much has been done to awaken their interest and give them higher ideals of the life-work they have chosen. The Executive Committee voted an appropriation for Professor Van Pelt to spend in Paris in the purchase of drawings for the college. These consist of five complete sets of drawings in architectural design, seven twelve-hour architectural sketches, and three decorative designs, all made by some of the foremost artists of the French school. Since then other drawings of a similar character have been added to the collection. In addition to these the college has secured, through the instrumentality of Professor Martin, a fine collection of working drawings of buildings actually constructed. These drawings have been contributed by the leading architects of the country, and the collection is constantly receiving new accessions.

Under the skilful direction of Professor Brauner the work in free-hand drawing has become one of the most attractive features of the course. The students waste no time in tracing and in copying conventional lines, but are at once taught to draw from models. The value of this training in the later work of design can be fully appreciated only by one who has failed to receive it. A system of public exhibitions and criticisms has been instituted, and has produced a healthy and stimulating rivalry among the students.

The present aim is to increase as much as possible the æsthetic side of the work without weakening the constructive. In fact, *pari passu* with the increase of the work in design has gone an increase of the work in construction. In the bitter controversy now waging between the extreme advocates of the Beaux-Arts methods and their enemies, the faculty holds itself aloof, endeavoring to choose that which is good in the Beaux-Arts methods but at the same time keeping in mind American conditions and seeking to develop the individuality of the student along rational lines. The major part of the study, it is true, is given to Renaissance design based upon the French and Italian schools, but during the present year a number of charming studies have been made in English Gothic and in English and Flemish Renaissance; and even the little shingled and half-timbered American houses have received recognition, much to the surprise and pleasure of those who feared that the current was about to sweep away every vestige of Americanism and engulf it in the ultra-French school.

Perhaps the most urgent necessity at the present moment is a building suited to the needs of the college; but what the faculty would like better than this is a fine-arts building, where architects could study their profession side by side with embryo painters and sculptors. The inspiration which such an atmosphere would give would certainly be of lasting benefit to any student, and would help Cornell to justify her profession of giving instruction to any person in any study.

CHAPTER VIII

THE NEW YORK STATE COLLEGE OF FORESTRY

THE New York State College of Forestry came into existence in March, 1898, when Governor Black signed an act of legislature which provided for the establishment of a college of forestry at Cornell University. The trustees of the university, at a special meeting held April 14, 1898, accepted this new trust, and initiated the organization of the new institution by the appointment of Dr. Bernard E. Fernow, Chief of the United States Division of Forests, as director and professor of forestry, and of Filibert Roth, of the same government bureau, and assistant professor of forestry and forest manager.

Dr. Fernow had received his education in forestry in Germany, having been a member of the Prussian Forest Administration for seven years, and had been foremost in the advocacy of the practice of forestry in the United States. For his services in this connection the University of Wisconsin had conferred on him the degree of Doctor of Laws, and later the same degree was conferred on him by Queen's University, Canada.

The object of the New York State College of Forestry was to educate men for the profession of forestry, to give technical instruction to forest owners and their employees, and to awaken general interest in the subject of the preservation and the proper use of American forest property. The general instruction in this department was to be given at the university, but every student taking the degree of Bachelor of Science in forestry was to be required to make experiments and investigations, conducted under the direction of university teachers, upon the Demonstration Tract in the Adirondacks as a part of his course of study.

The college was inaugurated in September, 1898, with five regularly registered students in its full course of four years, and twenty-four students from other colleges of the university, who elected a part of their work in forestry. The college grew rapidly in numbers during the following five years, the total number of students who registered in 1903, the last year of the existence of the college, being seventy-three. The degree of Bachelor in the Science of Forestry, which was later changed to Forest Engineer, was conferred for the first time, in 1900, on Ralph C. Bryant, now assistant chief of the Forestry Bureau at Manila, P. I., and since then nine have received the degree of Forest Engineer.

Two assistant professors were employed in the college. Dr. Filibert Roth, who began his work with the opening of the college and resigned in 1902, was succeeded by Judson F. Clark and Dr. John Gifford. Two special lecturers gave short courses; Dr. Barton W. Evermann on fish culture and game preservation, and Mr. Wetmore on marketing the forest crop.

The Demonstration Forest, to which both the junior and senior classes were transferred each spring for experimental investigations, consisted of 30,000 acres, located near Tupper Lake station, which were deeded by the owners to Cornell University, the state paying for the same $165,000. The deed contained a clause that, after thirty years of use by the university for the contemplated demonstration, the land was to be deeded to the state. The university was to have the right to cut and sell timber, but the moneys received from the sale were to be returned to the state treasury.

TRUSTEES

Charles H. Blood (since 1901)
Charles E. Treman (since 1902)

George Brinkerhoff Turner (since 1892)
George Roe Van De Water (1885-1890)

The land was purchased from the Forest Preserve Board, and paid for by an appropriation made for that purpose in the spring of 1899. At the same time an appropriation of $30,000 was made by the state for the survey and first expenditures in establishing the demonstration tract. Another $30,000 to be used as a working fund was appropriated the following year, and, at the same time, legislation was enacted authorizing the use of all income from the land without the necessity of further appropriations, thus placing the demonstration on a strict business basis, the sale of timber being expected to produce enough income to pay for the experiments.

The university immediately entered upon a contract for the sale of all logs and cordwood that might be cut during the conduct of the demonstration in accordance with good forestry practice. Logging camps were established, railroads and roads were built, and nurseries for the growing of plant material were instituted. The Brooklyn Cooperage Company made large outlays for factories to utilize the wood product. All that was necessary to show how practical forest management for business purposes should proceed was done on a large and efficient scale. The plans for this procedure were reported annually, in detail, as they progressed, by the director of the college through the president of the university to the governor and legislature. During the second year of its operations, the college incurred criticism and active opposition from the neighboring landowners who had hunting and fishing preserves in the vicinity, who objected to the cutting of trees, the very thing for which the demonstration was inaugurated. Adverse criticism was disseminated through the press of the state during the winter and the following summer, and a legislative committee was induced by the camp-owners to visit the tract and make a report of the proceedings. The university, feeling that it was acting under competent advice, and being under private contract to deliver certain amounts of wood annually, could not change its policy and mode of procedure. The legislature did not take cognizance of the adverse report of its committee, but voted to appropriate the usual $10,000 for the maintenance of the college and an additional $5,000 to assist in the planting operations on the demonstration area. This action on the part of the legislature was regarded as equivalent to an assurance that the future of the college was secured for at least the ensuing year, when the item in the appropriation bill providing for the support of the college was vetoed by the governor.

The Board of Trustees of the university could not but feel that the wishes of the state in regard to the Adirondack tract should be observed, and, much as they regretted being compelled to deprive a number of students of the opportunity to complete their course, they decided at the June meeting in 1903 to discontinue the College of Forestry and dismissed its faculty.

The most important publication of the college is *The Economics of Forestry,* a reference book for students of political economy and professional and lay students of forestry, by the director of the college. Numerous other publications embodying the results of investigations were made by the staff of the college.

Thus, just as the universal necessity for forest preservation was most widely felt, both from an industrial standpoint and for the preservation of the waters of the state, when other universities were establishing similar courses of instruction independent of the state, and when the new territories of the United States in the West Indies and in the Philippines needed expert assistance in order to preserve their forests, the Empire State abandoned temporarily its splendid undertaking.

CHAPTER IX

THE GRADUATE DEPARTMENT

ONE of the most striking features in the history of American learning in the last quarter of a century has been the introduction of graduate courses of instruction in the leading universities. Such instruction is necessarily professional, having immediate regard to the future career of the student who pursues it. Special training in preparation for a professor's chair was, until recently, possible only by study in foreign universities. Few American students were registered in the lists of matriculates of either English or German universities until within a comparatively recent period. Mr. John Quincy Adams, afterward President of the United States, was registered as a student in the University of Leyden, while his father occupied the position of American minister to the Court of St. James. A few American students found their way to Germany for study during the first quarter of the nineteenth century. They brought back to this country a fresh knowledge of classical study obtained directly from sitting at the feet of masters of European scholarship, and also a personal acquaintance with the modern languages. Among these distinguished scholars were Edward Everett, George Bancroft, Frederick Henry Hedge, and George Ticknor, and, in immediate succession, Henry Wadsworth Longfellow, George Washington Greene, and later James Russell Lowell and many others. Some American scholars went to the English universities, and many students of philosophy and theology went a little later to the universities of Germany. The number of American scholars, however, who had studied abroad was still very limited, and a residence of a few years at a foreign university was in itself almost a title of distinction. Positions in American universities were usually filled by selecting some promising graduate and appointing him to the position of tutor. His special preparation upon entering upon his duties did not extend beyond his undergraduate studies. In practice, he prepared himself for his chair after appointment to it. Far-sighted scholars and educators looked forward to the time when American universities would furnish broadly to American students the education which had only been possible in Europe.

Graduate instruction was instituted at Harvard in 1863, mainly by establishing courses of advanced lectures in certain fields of science, literature, and philosophy. These lectures continued for nine years, when they were given up. The result had been disappointing, mainly through a lack of definite organization, the systematic arrangement of courses, and by inadequate provision in those established. President Eliot, in commenting upon the failure of this attempt, said: "Advanced students want profound, continuous, and systematic teaching. The university lectures taken together, as a body of teaching, have been discursive, heterogeneous, and disconnected."

In 1872 a graduate department was formed, which has since been a permanent feature of Harvard University. It was placed in charge of an academic council, consisting of the president, professors, and assistant professors.

The most notable achievement in graduate instruction in America, and one which has profoundly affected all other universities, was that successfully inaugurated at the Johns Hopkins University in 1876. However limited it may have been in its scope, it was preeminently successful in the field which it covered.

No graduate students are mentioned in the registers of Cornell for the first two years after its opening. The earliest register, however, announces that the degree of Master of Science will be conferred upon such bachelors of Science as may exhibit to the faculty satisfactory proof of proficiency in general science and in some special science. "The degree of Doctor of Philosophy is conferred upon such Bachelors of Philosophy as may give satisfactory proof to the faculty of literary or general proficiency; upon such Bachelors of Arts, of Philosophy, or of Science as have completed a meritorious, original investigation in chemistry. The degree of Master of Arts is conferred upon such Bachelors of Arts as may give proof satisfactory to the faculty of literary proficiency. The degree of Civil Engineer is conferred upon such Bachelors of Science as after six trimesters, or two years of additional study, have passed the requisite examinations in the School of Engineering." The first advanced degree given by the university was conferred in 1870 upon Henry T. Eddy, an assistant professor, who received the degree of Civil Engineer. The reading of the conditions upon which such degrees were conferred shows that no definite system had been adopted. In the following year two graduate students are reported in attendance. There is no specification of any unity of subjects as preliminary to the reception of an advanced degree, no statement of examinations, no provision for principal and subordinate subjects, and, in general, no exact statement of the time of study required or of a thesis as essential, save in chemistry. The faculty eventually regarded it as important that the requirement for its highest degree should be made more specific, and we find a more definite statement presented in the register of 1872-73. It was there provided that the master's degree might be acquired after three years spent in literary pursuits, either teaching or in study, which study should not be exclusively provisional, on passing an examination in some department of science and literature, and presenting to the faculty a satisfactory thesis on some subject agreed upon between the student and the faculty, or after having passed one year in scientific or literary study either at this university or elsewhere with the consent and approval of the faculty, on passing his examinations and presenting a satisfactory thesis on some subject within the department of study to which he has chiefly devoted his attention.

For the degree of Doctor of Philosophy, a knowledge of the Latin language was required, equal to that now demanded for admission to the classical course in the university. At least two years of study after graduation under the direction of the faculty was required, also a satisfactory examination, and a meritorious thesis based on an original investigation. Provision was also made for conferring the degree of Doctor of Veterinary Medicine after two years spent in additional study, and also the degree of Architect for two years of post-graduate study and practice of architecture in the university. It is noticeable that no provision is made here for requiring residence at the university.

The registers of those early years show only a limited number of graduate students. In 1871-72 there were but two graduate students; in 1872-73, five; in 1873-74, eleven; 1874-75, thirteen; 1875-76, thirteen; 1876-77, twenty-three; 1877-78, thirty; 1878-79, twenty-one; 1879-80, nine; 1880-81, fourteen; 1881-82, twenty-two; 1882-83, thirty-six; 1883-84, twenty-one; 1884-85, twenty-two; 1885-86, twenty-six; 1886-87, thirty-two;

TRUSTEES

Walter Craig Kerr (since 1890)
David Starr Jordan (1887-1892)

Samuel Dumont Halliday (since 1891)
Leland Ossian Howard (since 1900)

1887-88, forty-three; 1888-89, fifty-two; 1889-90, eighty-one. The number of those who received advanced degrees during this early period was limited. In 1871-72 three advanced degrees were conferred; in 1872-73 two, in 1873-74 three, in 1874-75 seven, of which four were in civil engineering, in 1875-76 four, all of whom received the degree of Master of Science, in 1876-77 ten, in 1877-78 eight, in 1878-79 three, and in 1879-80 four.

During the first twenty years after the founding of the university, the average number of graduate students did not exceed seventeen, and the average number of degrees conferred per year was four. With the large increase in attendance in the university which occurred in the first years of President Adams's administration, the number of graduate students increased rapidly. In 1889, the number in attendance was eighty-one, and in the following year it was one hundred and ninety-two. The degree of Doctor of Philosophy was conferred upon graduates in any one of the four general courses in the university—arts, philosophy, literature, and science. As no Greek was required in three of these courses, the degree of Doctor of Philosophy was conferred with only Latin as a basis in the courses of literature and philosophy. Graduates with the degree of Bachelor of Literature could receive the doctorate in philosophy after studying Latin a single year after admission, and Bachelors of Science, whose linguistic foundation was in French and German alone. In the year 1873 a knowledge of Latin and Greek equal to that required for admission to the classical course was essential for the doctor's degree.

In 1876 the degree of Doctor of Science was established, which was open to graduates of this university and of all other universities and colleges whose requirements for the bachelor's degree were equal to those at Cornell. It was necessary for the candidate to have a knowledge of Latin and Greek equal to that required for admission to the course in natural history, a knowledge of French and German equal to that required for graduation in the course in science, and a knowledge of science, literature, and philosophy equal to that required for graduation in the course in philosophy. It was necessary for the candidate to spend three years in advanced study, two of which had to be passed at this university. It was required that their studies should embrace two scientific subjects approved by the faculty, either in chemistry, physics, mathematics, or natural history; an examination, and a thesis based upon some original investigation were required.

The requirements in language for the course in natural history embraced plane trigonometry, Allen's Latin Reader with an adequate grammatical knowledge, and in Greek the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms. The requirements in the course in natural history were in advance of those in science, and constituted the basis for admission to candidacy for the degree of Doctor of Science.

In 1885 a careful revision of the requirements for advanced degrees went into effect. It was provided that candidates for advanced degrees should present themselves for examination in one major and two minor subjects, which must have been determined upon with the approval of a special committee of the faculty. The requirement of three subjects for the master's degree has since been reduced to one major and one minor. It was also provided that for the degree of Master of Arts, or Doctor of Philosophy, the degree of merit would be indicated in the diploma by one of the terms "cum laude," "magna cum laude," "summa cum laude," and, for advanced degrees in science or engineering, by the terms "with distinction," "with high distinction," "with the highest distinction." The degree of Master of Arts or Master of Science was conferred after one year of resident study at the university, or an equivalent amount of work done elsewhere. It was, however, provided that the degree should not be given to non-resident students, until three years after the baccalaureate degree had been received. The degree of Master of Civil Engineering or Mechanical Engineering was conferred upon candidates who had received the corresponding first degree, upon presenting a satisfactory thesis and passing the required examinations, after one year of resident study or after two years of professional practice and study. For the degree of Doctor of Philosophy, it was provided that the candidate must spend two years at the university, pursuing a course of study marked out by the faculty, and for the degree of Doctor of Science three years, two of which should be spent at this university in the study of three approved subjects.

In 1896, upon the substitution of the degree of Bachelor of Science for the earlier degrees in the general courses, the advanced degrees of Master of Philosophy, Master of Literature, Master of Science, and Doctor of Science were abolished, and only the degrees of Master of Arts and Doctor of Philosophy were retained. In 1898 three years of resident study were required for the doctorate, but it was provided that a year of graduate work done elsewhere might be substituted for a year of such work in this university.

After 1875 it was provided that a certain number of printed copies of the theses submitted for the doctorate should be deposited in the university library. This number has varied at different times from ten to fifty. At the present time it is required that fifty copies of all theses for the doctor's degree shall be deposited in the university library.

No tuition was required of graduate students until 1890. In that year it was provided that resident graduates not candidates for a degree should pay the regular tuition required of undergraduates. It was found, however, that a large number of students who did not intend to remain at the university long enough to pursue a thorough course of study for an advanced degree took advantage of this provision and registered as candidates for a degree. It was therefore provided in 1894 that tuition should be required of all graduate students. As students in engineering were allowed to present themselves for an advanced degree without residence, it was provided that such students should pay in advance the tuition for one year. The effect of requiring tuition from graduate students was naturally to reduce the number of graduate students. In the year 1893 the number of such students was 231, in the following year 188, and in the second year 145. An important factor, however, in reducing the attendance of graduate students at this time was the financial crisis of 1893, which affected, if not immediately at least in the years following, the attendance at all the leading universities and colleges of the country.

The decline in the number of graduate students in the last ten years at Cornell has been mainly in the engineering courses, in physics, political and social science, and in philosophy. Some courses have remained comparatively uniform, such as English, history, and Greek, while the attendance upon other courses has increased, as is the case in the classical and modern languages, geology, botany, entomology, microscopy, and histology.

As to the place of graduate instruction in university

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education, President Schurman has remarked: " It is in connection with the graduate department that most of the work at Cornell in research and investigation is carried on. For the future of our civilization this work is quite as important as teaching. The principal conditions for its successful prosecution are leisure, or freedom from preoccupation with other duties on the part of the investigator, and an abundant supply of books, apparatus, and similar instrumentalities. For these, money is indispensable; all research is expensive. But truth when obtained is of such priceless value that the endowment of investigation is perhaps the most directly fruitful of all methods of advancing civilization and promoting the happiness of mankind. Would all the generous founders of the professorships in Glasgow University have received a bad return for their investment, if the university had absolutely nothing to show for the last century but Professor Adam Smith's *Wealth of Nations,* and for the present century only Professor Thompson's (Lord Kelvin's) numerous discoveries and inventions in physical science and its applications? " President Jordan has said: " The graduate students are the crown of the university, and Cornell cannot afford to neglect them for the sake of any others. One student in quaternions is worth more to the university than a dozen in trigonometry. One student in the Nibelungenlied or in Germanic philology is more than a dozen stumbling over the elements in Whitney's Grammar, and one trained to carry to an end a scientific investigation is worth a dozen learning to analyze flowers, or even to identify the muscles of a cat."

President White early felt the need of the establishment of fellowships and scholarships to promote advanced study and research, and one of the crowning features of his administration was the establishment, during the last year of his presidency, of the system of university scholarships and fellowships.

In the year 1872 the young university found itself burdened with apparently a hopeless debt, which had been increased constantly since the erection of buildings began, the cost of which in most cases had to be taken from the regular income of the university. The principal of the proceeds of the National Land Grant and of the Cornell Endowment Fund was inviolate. The income of the former could not be used for buildings, and only that of the latter was available for this purpose. The expenses of the university had largely exceeded its income. The university commons and Cascadilla Place showed an expense of fifteen thousand dollars above receipts. Large sums were due upon the buildings and also for the purchase of books, collections, and materials. Scores of notes of the university were held by generous citizens. No more depressing situation has perhaps occurred in the history of the university than that which the trustees were forced to meet when they assembled in Albany on the 23d of November, 1872. At this meeting Mr. Cornell offered to give thirty thousand dollars, provided other members of the board would contribute twenty-five thousand dollars each to extinguish the debt of the university. The noble men whose names deserve to be borne in perpetual remembrance for their gifts at this time were Ezra Cornell, John McGraw, Henry W. Sage, Hiram W. Sibley, and Andrew D. White, who together contributed one hundred and fifty-five thousand dollars to meet the threatened bankruptcy. It seems to have been understood that this amount should constitute later a sum which, when the income of the university permitted, should be devoted to founding scholarships and fellowships.

In the year 1884, on the 27th of October, the trustees saw themselves in a position to devote this sum to this latter purpose. The income of one hundred and fifty-five thousand dollars at five per cent. was devoted to establishing twenty-four undergraduate scholarships of an annual value of two hundred dollars, and seven fellowships of the annual value of four hundred dollars. These fellowships were named the Cornell Fellowship, the McGraw Fellowship, the Sage Fellowship, the Sibley Fellowship, the Schuyler Fellowship, the Goldwin Smith Fellowship, and the President White Fellowship. The Schuyler Fellowship was named after the Hon. George W. Schuyler, the first treasurer of the university and for many years one of its most intelligent and devoted trustees. Later an eighth fellowship, bearing the name of the Hon. Erastus Brooks, one of the first elected trustees, was established. The fellowships were made tenable for one year, but it was provided that in exceptional cases the general faculty might, by a two-thirds vote, extend the term to two years. It was provided that the candidates should be of high character and marked ability in some important department of study. They were to be selected by competitive examination, or by ballot of the general faculty on presentation of some one or more of the special faculties, or by a combination of both methods; or some might be selected by one and some by another of these methods as the faculty should deem best. It thus appears that these fellowships were not assigned to any given subject or group of subjects. Later, upon reorganizing the system, these fellowships were increased in number and assigned to special subjects or departments.

When President White presented his library to the university, he provided that the university should in return, among other conditions, provide two President White fellowships of an annual value of six hundred dollars, one in modern history and one in political and social science. When the Sage School of Philosophy was inaugurated it was provided that from the income of the fund then given, four Susan Linn Sage fellowships in philosophy, of the annual value of four hundred dollars, and six graduate scholarships, of the annual value of two hundred dollars, should be established. The number of fellowships in philosophy was subsequently changed to three.

While provision had thus been made for fellowships in various departments, there had been no provision for fellowships in English, French, or German, and an application was made by the professors in these departments for special fellowships to be assigned to these branches (1892).

On October 9, 1893, ten additional graduate scholarships of the annual value of three hundred dollars, and five additional fellowships of the annual value of five hundred dollars, were established. At the same time, the annual value of the existing scholarships was increased to three hundred dollars, and that of the earlier fellowships to five hundred dollars. These later fellowships and graduate scholarships were not at first assigned to any department, but were awarded by a vote of the general faculty to those applicants whose claims by reason of high attainments and previous work were considered strongest. In the following year, however, they were assigned to special departments which had not previously had a fellowship. As the large departments of the Germanic and Romance languages only possessed a fellowship and a graduate scholarship in common, this inequality was removed and a fellowship established for each department, and the graduate scholarships were also assigned to certain subjects or groups of studies, the importance of which demanded additional recognition.

In 1898 a traveling fellowship in architecture, tenable for two years, of the annual value of one thousand dollars, was established.

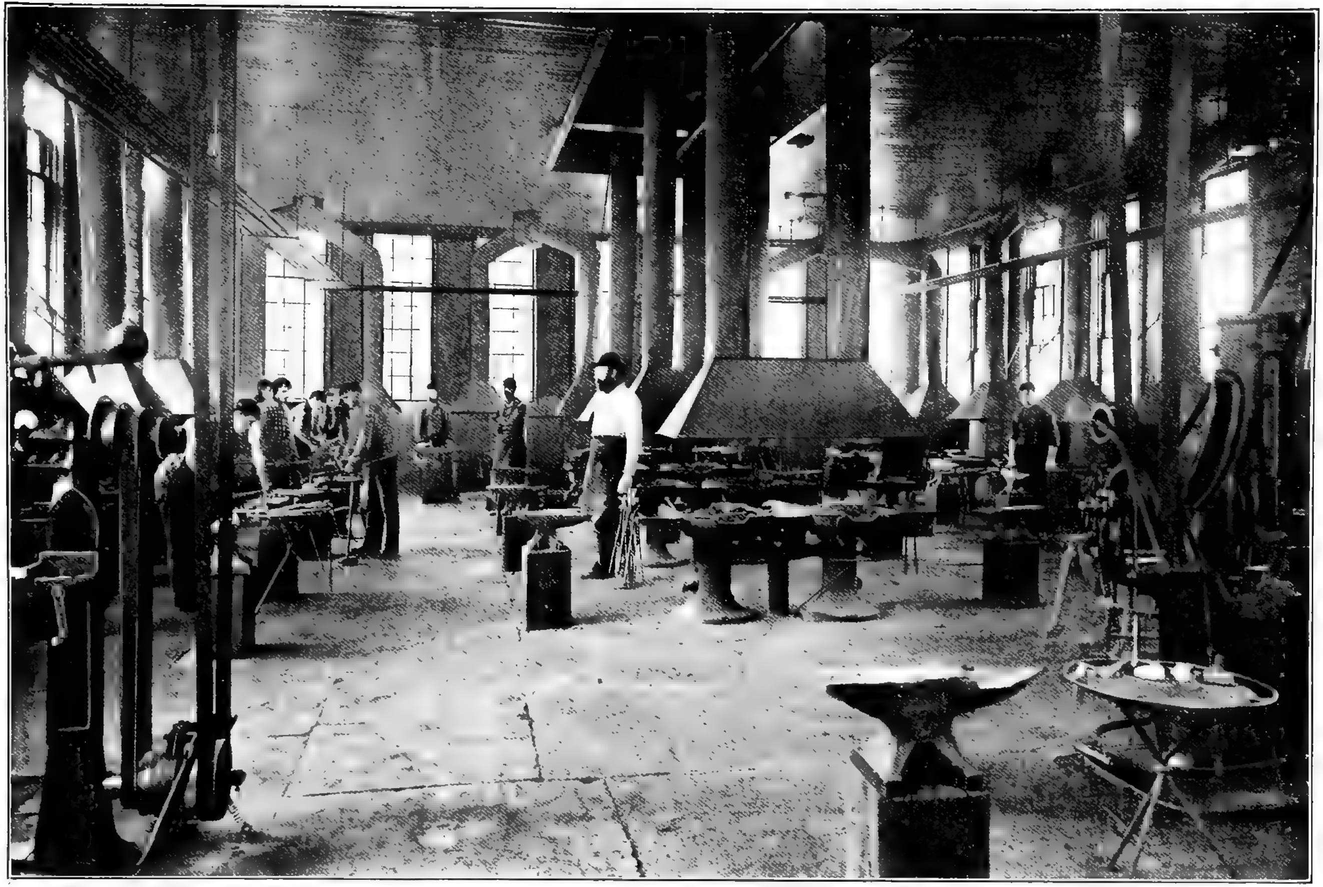
There are at present in the university twenty-four fellowships, of which twenty-one have a value of five hundred dollars, two of six hundred, and one of two thousand, and sixteen undergraduate university scholarships having an annual value of three hundred dollars; also the Oliver Graduate Scholarship in mathematics, founded in November, 1896, in memory of Professor James Edward Oliver, of an annual value of three hundred dollars.

CHAPTER X

THE SUMMER SCHOOL

THE Summer School for purposes of popular instruction had existed for many years. The work of such schools was most often limited to the modern languages or to some branch of science. Familiar instruction in living languages, for the purpose of teaching conversation and pronunciation, was conducted as a private enterprise usually in some college town. These schools were popular in character, and often of much service to teachers, in affording a practical training in language which they had not previously enjoyed. Advanced students of science frequently studied under the private instruction of distinguished scientists in their laboratories. Schools for the study of marine forms were opened, some in connection with the United States Coast Survey, notably at Wood's Holl, and also upon one of the islands in Casco Bay. The most notable example of this kind was the experiment at the island of Penikeese, under the auspices of Professor Agassiz, in which several professors of Cornell and students participated. Such students always returned to the university enriched by their experience in dealing with deep-sea forms, and more particularly by the wonderful revelations of the seashore, which some beheld for the first time. The impulse which sprang from such studies was a potent one in the lives of many scholars who have later become distinguished. The summer courses of instruction at Harvard were established in 1874 and placed under the charge of a committee appointed by the president and fellows. These courses were, however, few in number, and confined mainly to chemistry, botany, physics, geology, and the modern languages. They were designed for teachers and for students who desired special preparation for advanced work in the ensuing terms. The attendance was small. The first university to organize a summer school and to make such work a regular and permanent part of the curriculum was the University of Chicago, which was organized in the autumn of 1892. The academic year was divided into four terms of twelve weeks each. It was made possible for the professors to elect the terms in which their instruction should be given. If they chose to retain the summer for rest, it was within their province to do so. If, on the contrary, they desired to use the winter for purposes of travel or for special investigations, they could elect to give their instruction in the summer. The success of this system has caused it to be retained as a permanent part of the curriculum of the university, although a similar arrangement has not commended itself to the educational world in general.

In the year 1891 a group of younger professors and instructors requested the Executive Committee of the university to permit them to use certain lecture rooms and apparatus in the university for the purpose of a summer session. The organization of the school was entirely independent, and those who engaged in it remained entirely responsible for its expenses and success. It was the purpose of the school to offer courses especially designed to benefit teachers of schools from which the university drew its patronage. It was believed that by reason of the more intimate relations so formed with the schools and of the broader knowledge and better methods of instruction which the teachers would acquire, that the pupils from those schools would come to the university better prepared for their work, and that thus the university would experience a material advantage. It was held to be a practical scheme of university extension by which the teachers should be taught under university instructors, by university methods, with access to the university libraries, museums, and laboratories. The faculty approved of the application, but suggested that the courses should not be announced in the name of the university, that the plan should be regarded for the present as an experiment, and that the studies thus conducted should not be treated as part of any university work. While instituted to provide especially for teachers, it was provided that other pupils should not be excluded. Courses of instruction were offered in botany, chemistry, mathematics, philosophy, physics, English, French, German, drawing, and physical training. One hundred and fifteen students were in attendance the first year, of whom eighty-five were teachers or advanced students. The success of the school, though modest, was encouraging, and the trustees voted on November 22, 1892, that a " Summer School be established by the university." They, however, provided that " the management of the school, both on its financial and educational sides, should be in the hands of the teachers." The school was declared " an integral part " of the university, and an increased number of courses announced. The courses and the names of the pupils were published in the university *Register*. Like the early universities, this school was a voluntary association, administered by those who taught, who were responsible jointly for the expense, and shared the proceeds according to the number of attendants upon their courses. The university faculty voted that the same credit should be given for work in the Summer School as was given for the same amount and kind of



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work done in the university, but that the amount of such credit should not exceed eight university hours. Certificates of attendance were granted to those who were not regular university students. In addition to the subjects which had been previously taught, courses of instruction in Greek, Latin, elocution and oratory, ethics, the history of philosophy, psychology, theoretical and experimental, pedagogy, and political and social science were inaugurated. "It was in general assumed that the persons most likely to be interested and profited by summer work in the university were to a certain extent university and college instructors from other institutions, but mostly high-school teachers, who, it was thought, would welcome an opportunity of reviewing and extending their knowledge. With this idea in mind, the courses offered were in the main those naturally adapted to high-school teachers, while in most departments some courses were offered in advanced work." About twenty professors and instructors participated in the school and fifty-four courses were offered. In the beginning, all the instructors were from the faculty of the university. The session began at the close of the first week in July and continued for six weeks.

At the same time (1893) a summer term in the Law School, but independent in its jurisdiction, was inaugurated. "The courses offered will be open to all persons who may desire to take advantage of them, but they will be conducted with particular reference to the needs of the following classes of students: first, those who desire an opportunity for a comprehensive review, preparatory to an application for admission to the bar; second, those who wish, before entering upon a regular law-school course, to obtain some general notions of the law and to become familiar with law-school methods; third, those who are unable to spend more than a single term at a law school. It is thought, also, that the opportunities offered will be of advantage to students in this and other law schools who may desire to spend a part of the vacation in regular and systematic study, and to business men. The work of this term, however, will not be received as an equivalent for any of the required work of the regular course.

" No preliminary examination for admission will be exacted, but each student must, before his matriculation, satisfy the associate dean that he possesses sufficient general education to enable him to undertake with profit to himself the work of the term."

Instruction was offered in real property law, equity, crimes and torts, codes of procedure, corporations, contracts, mercantile law, including partnership, and bills and notes, evidence, domestic relations, bailments, wills, and administration.

As orignally arranged, each professor in the Law School delivered thirty lectures in the period of two weeks, demanding the entire attention of all the students to his courses for this time. The professor having thus condensed his work into a limited period, sacrificed only a small part of his vacation. Instruction in the Law School continued for six years, and ended with the summer of 1898. The attendance at the school during the last two years reached a maximum of only twenty-three students.

With the increasing attendance upon the Summer School there was a corresponding increase in the number of courses offered.

" This state of things continued until 1898, when the Executive Committee, after a careful consideration of the facts, decided that no private summer schools should be held in the university buildings, and established an official summer session, in which instruction should be offered in all subjects included in the high-school curriculum, as far as possible, and should be of the highest grade, and, in general, in the hands of professors and not of the subordinate members of the faculty. It was further provided that appointments to the teaching staff should be made by the Board of Trustees or the Executive Committee on the nomination of the president, and at such rate of compensation as might be fixed by the trustees. It was also decided that the primary object of the summer session was to furnish instruction to teachers in high schools and academies, and that it should not be used as a school to prepare students for entering the university, but that provision for the instruction of college professors, university students, and others who are qualified to take the instruction should not be excluded.

" The summer session was duly organized under the above general scheme by the appointment of Professor De Garmo as dean, and the selection of a staff of instruction consisting for the most part of heads of departments and assistant professors." A uniform fee for registration and instruction was established, admitting to all courses.

As it often occurred that professors preferred to devote their summer vacation to rest or special work, it became necessary to invite distinguished scholars from other universities to take their places. It therefore happens every year that the faculty of the school embraces the names of many eminent lecturers from other institutions.

The courses of instruction have been increased in number until now more than one hundred courses are given each year and about sixty professors and instructors participate in the school.

In the summer of 1903, upon the recommendation of Professor Tarr, an eminent specialist in physical geography, it was proposed to institute a summer school of geography, including in its courses geology, commercial geography, physical geography, geography of the United States, home geography, and field work in geography. Owing to the reduced numbers in attendance in the school following the epidemic of that year, the success of this school was not marked, although valuable courses of instruction were given by specialists in different fields in which work had been provided.

The attendance of the school proved large in proportion to the number of students and the corresponding attendance in other courses.

During the sessions of the Summer School, the agricultural department conducted a summer school in nature study. The attendance of teachers in these special courses numbered, in 1899, 111, and in 1900, 89. This arrangement, however, did not extend beyond the time indicated.

It is interesting to note the high character of the students of the Summer School. In 1900, out of 445 students, there were 144 graduates of colleges and 175 undergraduates of this university and of other colleges. In 1901 there were 152 graduates of colleges, and 167 undergraduates. In 1902 there were 158 graduates of colleges, and 345 undergraduates of colleges. In 1903 there were 98 graduates of colleges, and 367 undergraduates. In 1904 there were 82 graduates of colleges, and 365 undergraduates. The proportion of teachers during the last five years has varied from thirty-three to eighty per cent., and the number in attendance has been as follows: In 1900, 355; in 1901, 253; in 1902, 255; in 1903, 154; in 1904, 356. In the years 1899 and 1900 the large proportion of teachers was due to the facilities for nature study, for which no tuition was required of teachers from New York. The number in attendance from the state of New York is not quite as large as that from without the state, the number from New York in 1900 being 215; in 1901, 177; in 1902, 249; in 1903, 201; in 1904, 244. The number from without the state was, in 1900, 230; in 1901, 247; in 1902, 298; in 1903, 269; and in 1904, 474.

The session of 1904 was marked by the coming of a large number of teachers and students from the island of Porto Rico. These students came through the superintendent of public instruction in Porto Rico. They were transported upon a government vessel. The attendance was divided between Harvard University and Cornell. These students came primarily to learn more of the English language, but equally to comprehend better the ideals and practices of the American public schools. They were a bright and interesting group of young scholars. The experience thus afforded them will be of great value in making them familiar with American life and institutions, of which hereafter they are to be a part. The expenses of these pupils were defrayed in part by the United States government, and in part by the individuals. After their visit to the university they were taken to Washington, and visited also the leading cities of the East before their return.

The purpose of the Summer School has changed, in part, by a demand which could not have been foreseen at the time of its organization. An increasing number of undergraduates desiring to devote their summer to advancing more rapidly in their university courses, or to take up certain branches for which their regular curriculum affords no opportunity, or possibly to make up some deficiency in their preparation for the university, have taken advantage of the courses here in the Summer School for this purpose. Recently a new feature of the school has opened a provision by means of which a student may elect exclusively French or

German and devote his entire time to a rapid mastery of the required work of the first or the second year. The number electing this course has constantly increased, and the result has been altogether favorable. A table is submitted of the attendance at the Summer School since it was established.

ATTENDANCE IN THE SUMMER SCHOOL.

	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904
General	115	141	248	234	190	171	180	424	445	424	548	470	718
Law	—	39	34	41	47	23	23	—	—	—	—	—	—
Totals	115	180	282	275	237	194	203	[1]424	[2]445	424	548	470	[3]718
Teachers	85	92	—	—	—	—	—	344	355	253	255	154	356
College graduates	—	67	—	—	—	—	—	130	144	152	158	98	120
Undergraduates of previous year	—	—	—	—	—	—	—	60	83	101	218	259	246
Undergraduates of previous years	—	—	—	—	—	—	—	25	26	5	64	63	59
Totals	—	—	—	—	—	—	—	85	109	106	282	322	305

[1] Nature-study students, 111. [2] Nature-study students, 89. [3] Porto Ricans, 145.

While the Summer School was officially established by the trustees in 1892, and formally organized under the direction of the trustees in 1898, it did not include an important and valuable method of summer work which had existed in the department of entomology since 1884, and which went into effect first in the summer of 1885. Professor Comstock, recognizing the importance of introducing his students directly to the personal study and observation of insect life, established in the latter year a summer course in entomology covering ten weeks. In effect, the winter course in entomology was in part suspended, and in its place a third term of study in the summer was substituted. Only those who trace the important and valuable contribution to scientific study which has been made by this department can estimate the value of these courses.

Hereafter, the work in entomology will constitute a regular part of the work of the Summer School.

A similar course in paleontology was introduced by Professor Harris in 1897. The students accompany the professor in his own steam yacht to the most interesting localities for the study of early geological forms. This constitutes a most important and valuable feature in the work of the geological department.

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